

U9/914757

Practitioner's Docket No. 81337CIPPCTUS

CHAPTER II

Preliminary Classification:

Proposed Class:

Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P., § 601, 7th ed.

**TRANSMITTAL LETTER
TO THE UNITED STATES ELECTED OFFICE (EO/US)**

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/US00/05649	02 MARCH 2000	02 MARCH 1999
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PLASTIC FASTENER, FASTENER CLIP, FASTENER DISPENSING TOOL AND METHOD		
TITLE OF INVENTION OF FASTENING OBJECTS		
JEFFREY A. RAYMOND, PAUL A. DAVIGNON, CHARLES L. DESCHENES,		
APPLICANT(S)		
WILLIAM J. COOPER AND CLARK L. GRENDOL		

Box PCT
Assistant Commissioner for Patents
Washington D.C. 20231
ATTENTION: EO/US

CERTIFICATION UNDER 37 C.F.R. § 1.10*
(Express Mail label number is mandatory.)
(Express Mail certification is optional.)

I hereby certify that this Transmittal Letter and the papers indicated as being transmitted therewith is being deposited with the United States Postal Service on this date Sept. 4, 2001, in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EL919994705US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

EDWARD M. KRIEGSMAN

(type or print name of person mailing paper)



Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

***WARNING:** Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 1 of 8)

NOTE: To avoid abandonment of the application, the applicant shall furnish to the USPTO, not later than 20 months from the priority date: (1) a copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the USPTO; and (2) the basic national fee (see 37 C.F.R. § 1.492(a)). The 30-month time limit may not be extended. 37 C.F.R. § 1.495.

WARNING: Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. § 1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing—See 37 C.F.R. § 1.8.

NOTE: Documents and fees must be clearly identified as a submission to enter the national state under 35 U.S.C. § 371 otherwise the submission will be considered as being made under 35 U.S.C. § 111. 37 C.F.R. § 1.494(f).

- I. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. § 371:
- a. ☒ This express request to immediately begin national examination procedures (35 U.S.C. § 371(f)).
 - b. ☒ The U.S. National Fee (35 U.S.C. § 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

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2. Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
<input checked="" type="checkbox"/>	TOTAL CLAIMS	101 -20=	81	x \$18.00=	\$ 1458
	INDEPENDENT CLAIMS	18 -3=	15	80 x \$78.00	1200
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$260.00				
BASIC FEE**	<input checked="" type="checkbox"/> U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: <input type="checkbox"/> and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(1) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 C.F.R. § 1.492(a)(4)) \$96.00 <input checked="" type="checkbox"/> and the above requirements are not met (37 C.F.R. § 1.492(a)(1)) \$670.00 690				690
	<input type="checkbox"/> U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: <input type="checkbox"/> has been paid (37 C.F.R. § 1.492(a)(2)) \$690.00 <input type="checkbox"/> has not been paid (37 C.F.R. § 1.492(a)(3)) \$970.00 <input type="checkbox"/> where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 C.F.R. § 1.492(a)(5)) \$840.00				
	Total of above Calculations				= 3348
SMALL ENTITY	Reduction by 1/2 for filing by small entity, if applicable. Affidavit must be filed also. (note 37 C.F.R. § 1.9, 1.27, 1.28)				-
	Subtotal				
	Total National Fee				\$ 3348
	Fee for recording the enclosed assignment document \$40.00 (37 C.F.R. § 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".				
TOTAL	Total Fees enclosed				\$ 3348

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 3 of 8)

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*See attached Preliminary Amendment Reducing the Number of Claims.

- i. ☒ A check in the amount of 3348 to cover the above fees is enclosed.
- ii. ☐ Please charge Account No. _____ in the amount of \$ _____.
A duplicate copy of this sheet is enclosed.

****WARNING:** "To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C.F.R. § 1.495(b).

WARNING: If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office. 37 C.F.R. § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.

3. ☒ A copy of the International application as filed (35 U.S.C. § 371(c)(2)):

NOTE: Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment. "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36. See item 14c below.

- a. ☐ is transmitted herewith.
- b. ☒ is not required, as the application was filed with the United States Receiving Office.
- c. ☐ has been transmitted
- i. ☐ by the International Bureau.
Date of mailing of the application (from form PCT/1B/308): _____
- ii. ☐ by applicant on _____
Date

4. ☒ A translation of the International application into the English language (35 U.S.C. § 371(c)(2)):

- a. ☐ is transmitted herewith.
- b. ☒ is not required as the application was filed in English.
- c. ☐ was previously transmitted by applicant on _____
Date
- d. ☐ will follow.

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10. ☒ An oath or declaration of the inventor (35 U.S.C. § 371(c)(4)) complying with 35 U.S.C. § 115
- a. ☐ was previously submitted by applicant on _____
Date
- b. ☐ is submitted herewith, and such oath or declaration
- i. ☐ is attached to the application.
- ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. § 1.70.
- c. ☒ will follow.

II. Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
- a. ☐ is transmitted herewith.
- b. ☐ has been transmitted by the International Bureau.
Date of mailing (from form PCT/IB/308): _____
- c. ☒ is not required, as the application was searched by the United States International Searching Authority.
- d. ☐ will be transmitted promptly upon request.
- e. ☐ has been submitted by applicant on _____
Date
12. ☐ An Information Disclosure Statement under 37 C.F.R. §§ 1.97 and 1.98:
- a. ☐ is transmitted herewith.
Also transmitted herewith is/are:
- ☐ Form PTO-1449 (PTO/SB/08A and 08B).
- ☐ Copies of citations listed.
- b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. § 371(c).
- c. ☐ was previously submitted by applicant on _____
Date
13. ☐ An assignment document is transmitted herewith for recording.
A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

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14. ☒ Additional documents:

- a. ☐ Copy of request (PCT/RO/101)
- b. ☐ International Publication No. _____
 - i. ☐ Specification, claims and drawing
 - ii. ☐ Front page only
- c. ☒ Preliminary amendment (37 C.F.R. § 1.121)
- d. ☐ Other

15. ☒ The above checked items are being transmitted

- a. ☒ before 30 months from any claimed priority date.
- b. ☐ after 30 months.

16. ☐ Certain requirements under 35 U.S.C. § 371 were previously submitted by the applicant on _____, namely:

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: Accurately count claims, especially multiple dependant claims, to avoid unexpected high charges if extra claims are authorized.

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

- ☒ The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. 11-1755.

- ☒ 37 C.F.R. § 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 7 of 8)

- ☐ 37 C.F.R. § 1.492(b), (c) and (d) (presentation of extra claims)

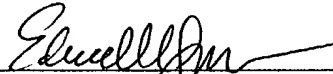
NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

- ☐ 37 C.F.R. § 1.17 (application processing fees)
☐ 37 C.F.R. § 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a).
☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. § 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

- ☐ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).



SIGNATURE OF PRACTITIONER

EDWARD M. KRIEGSMAN

(type or print name of practitioner)

KRIEGSMAN & KRIEGSMAN

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P.O. Address

FRAMINGHAM, MASSACHUSETTS 01702

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0991475 09/09/99 1475 7
518 Rec'd PCT/PTO 04 SEP 2001

PATENT
Attorney Docket No. 81337CIPPCTUS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
)	
JEFFREY A. RAYMOND ET AL.)	
)	
Serial No.: Unassigned)	Group Art Unit: Unknown
)	
Filed: Herewith)	Examiner: Unknown
)	
For: PLASTIC FASTENER, FASTENER))	
CLIP, FASTENER DISPENSING))	
TOOL AND METHOD OF))	
FASTENING OBJECTS))	

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

AMENDMENT

Preliminary to examination of the above-identified patent application, please enter the amendment below.

IN THE CLAIMS:

Please cancel claims 97-107, 109-113, 115-123, 125, 127 and 129 without prejudice or disclaimer of the subject matter thereof.

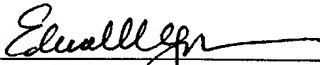
REMARKS

Claims 97-107, 109-113, 115-123, 125, 127 and 129 are herein canceled. No claims are herein amended or added. Therefore, claims 1-96, 108, 114, 124, 126 and 128 are under active consideration.

If there are any fees due in connection with the filing of this paper that are not accounted for, the Examiner is authorized to charge the fees to our Deposit Account No. 11-1755. If a fee is required for an extension of time under 37 C.F.R. 1.136 that is not accounted for already, such an extension of time is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

Kriegsman & Kriegsman

By: 
Edward M. Kriegsman
Reg. No. 33,529
665 Franklin Street
Framingham, MA 01702
(508) 879-3500

Dated: September 4, 2001

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on _____.

Edward M. Kriegsman
Reg. No. 33,529
Dated: _____



Rec'd PCT/PTO 29 JAN 2002

#3

PATENT
Attorney Docket No. 813337CIPPCTUS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
JEFFREY A. RAYMOND ET AL.)
Serial No.: 09/914,757) Group Art Unit: Unknown
Filed: September 4, 2001) Examiner: Unknown
For: PLASTIC FASTENER CLIP,)
FASTENER DISPENSING TOOL)
AND METHOD OF FASTENING)
OBJECTS)

Commissioner for Patents
Washington, D.C. 20231

Sir:

SUPPLEMENTAL PRELIMINARY AMENDMENT

Supplemental to the Preliminary Amendment filed September 4, 2001, and prior to examination of the above-identified patent application, please enter the amendment below.

IN THE SPECIFICATION:

Please amend the specification as follows:

After the title and before the section heading entitled "BACKGROUND OF THE INVENTION," please add the following section heading and subsequent paragraph:

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is a continuation-in-part of U.S. Patent Application Serial No. 09/483,180, filed January 13, 2000, now U.S. Patent No. 6,267,285, and a continuation-in-part of

U.S. Patent Application Serial No. 09/483,181, filed January 13, 2000, and also claims the benefit under 35 U.S.C. 119(e) of U.S. Provisional Patent Application Serial No. 60/122,557, filed March 2, 1999, the disclosures of all the foregoing applications being incorporated herein by reference.

REMARKS

No claims have been canceled, amended or added herein. Therefore, claims 1-96, 108, 114, 124, 126 and 128 are under active consideration.

The specification has been amended to include references to a provisional application for which the benefit is claimed under 35 U.S.C. 119(e) and to two non-provisional applications for which the benefit is claimed under 35 U.S.C. 120.

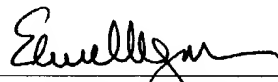
It is respectfully submitted that the present application is in condition for allowance. Prompt and favorable action is earnestly solicited.

If there are any fees due in connection with the filing of this paper that are not accounted for, the Examiner is authorized to charge the fees to our Deposit Account No. 11-1755. If a fee is

required for an extension of time under 37 C.F.R. 1.136 that is not accounted for already, such an extension of time is requested and the fee should also be charged to our Deposit Account.

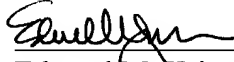
Respectfully submitted,

Kriegsman & Kriegsman

By: 
Edward M. Kriegsman
Reg. No. 33,529
665 Franklin Street
Framingham, MA 01702
(508) 879-3500

Dated: January 7, 2002

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on January 7, 2002


Edward M. Kriegsman
Reg. No. 33,529
Dated: January 7, 2002

PLASTIC FASTENER, FASTENER CLIP,
FASTENER DISPENSING TOOL AND METHOD OF FASTENING OBJECTS
BACKGROUND OF THE INVENTION

The present invention relates generally to the fastening of objects using plastic fasteners and relates more particularly to a novel plastic fastener, a novel fastener clip, a novel fastener dispensing tool and a novel method of fastening objects.

Certain articles of clothing, most notably men's dress shirts, are often packaged and sold in a folded condition so as to minimize any wrinkling of the article and so as to present the article in an otherwise flattering manner. Typically, the article is maintained in a folded condition by means of one or more straight metal pins, each of said straight metal pins typically comprising an elongated shaft terminating at one end in a sharp tip designed to penetrate the article and at the other end in a rounded head designed not to penetrate the article. Typically in use, the article is folded, and a plurality of said pins are used to maintain the article in its folded condition by securing the article to itself at a plurality of different locations. Often, in the case of men's dress shirts, one or more of said pins are additionally used to secure the shirt to a piece of cardboard or to a similar backing material. The act of using straight metal pins to maintain an article of clothing in a folded condition is typically referred to in the art as "shirt-pinning."

Although straight metal pins have achieved widespread use in maintaining articles of clothing in a folded condition, certain shortcomings are associated therewith. One such shortcoming is that no suitable tool exists for dispensing such pins into an article of clothing; consequently, the pins must be inserted manually. As can readily be appreciated, the repeated insertion of such pins into articles of clothing, over time, can become both physically and mentally taxing. Another shortcoming associated with the use of straight metal pins is that the pins, as noted above, have sharp ends, which can cause injury both to the person who must insert the pin into the article and to the person (i.e., consumer) who must remove the pin from the article. Moreover, once the pins are removed from the article, they must be disposed of properly to avoid injury to others. Still another shortcoming associated

with the use of straight metal pins is that such pins, when inserted, may cause damage to the article, either by snagging and tearing the article or by creating a conspicuous insertion hole in the article. Still yet another shortcoming associated with the use of straight metal pins is that such pins, once inserted into an article of clothing, can be difficult to access and manipulate in such a way as to enable their removal.

Plastic fasteners of the type comprising an elongated flexible filament having a first enlargement at one end thereof and a second enlargement at the opposite end thereof are well-known and have been widely used in the attachment of merchandise tags to articles of commerce, in the coupling or re-coupling of buttons to garments, in the binding of a shoe upper during the process of shoe-lasting, and in various packaging applications. In one common type of plastic fastener (see, for example, Fig. 1 of U.S. Patent No. 5,321,872, which patent is incorporated herein by reference), the first enlargement has the shape of a first transverse bar and the second enlargement has the shape of a paddle or the shape of a second transverse bar, the first transverse bar and the paddle (or second transverse bar) extending in planes parallel to one another. In another common type of plastic fastener (see, for example, U.S. Patent No. 3,494,004, which patent is incorporated by reference), the first enlargement has the shape of a transverse bar and the second enlargement has the shape of a knob or pin head. In still another common type of plastic fastener (see, for example, U.S. Patent No. 4,240,183, which patent is incorporated herein by reference), the first enlargement has the shape of a transverse bar or the shape of a plug and the second enlargement has the shape of a socket, said socket being adapted to receive said transverse bar or said plug.

Plastic fasteners of the various types described above are typically molded as parts of a unitary fastener clip. An example of such a fastener clip is disclosed in U.S. Patent No. 3,733,657, which patent is incorporated herein by reference. The clip of the aforementioned '657 patent includes a plurality of fasteners, each of said fasteners comprising a flexible filament having a first transverse bar (or "cross-bar") at one end thereof and a paddle or a second transverse bar (or "cross-bar") at the

opposite end thereof, the transverse bar and the paddle (or second transverse bar) of each fastener extending in planes parallel to one another. The fasteners are arranged relative to one another so that the respective transverse bars are spaced apart and oriented side-by-side and parallel to one another and so that the respective paddles (or second transverse bars) are spaced apart and oriented side-by-side and parallel to one another. The clip of the foregoing '657 patent also includes a runner bar, said runner bar extending perpendicularly relative to the respective transverse bars and being connected to each of the transverse bars by a severable connector. The clip of said '657 patent further includes a severable member interconnecting each pair of adjacent paddles (or second transverse bars).

Several commercial embodiments of the aforementioned fastener clip have been sold by the present assignee, Avery Dennison Corporation, as DENNISON® SWIFTACH® fastener clips. DENNISON® SWIFTACH® fastener clips comprising fasteners of the type having a cross-bar at one end of a flexible filament and a paddle at the opposite end of the flexible filament are generally made of polypropylene or nylon and are typically used to attach merchandise tags and the like to articles of clothing. The filaments of such fasteners are typically at least about 12.5 mm in length. DENNISON® SWIFTACH® fastener clips comprising fasteners of the type having a first cross-bar at one end of a flexible filament and a second cross-bar at the opposite end of the flexible filament are made of nylon and are used to attach merchandise tags and the like to a wide variety of articles of commerce. In addition, such fasteners are used in shoe-lasting applications and in packaging applications, where the high tensile strength afforded by the use of nylon in the fastener is desirable. The filaments of such fasteners are typically at least about 6.35 mm in length.

As far as the present inventors are aware, the above-described fastener clip, exemplified by the family of DENNISON® SWIFTACH® fastener clips, has not been used to maintain an article of clothing, such as a dress shirt, in a folded condition.

A second type of fastener clip (or "fastener stock") is disclosed in U.S. Patent No. 4,039,078, inventor Bone, issued August 2, 1977, which patent is incorporated

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a novel plastic fastener.

Therefore, according to one aspect of the invention, a plastic fastener is provided, said plastic fastener comprising (a) a flexible filament, said flexible filament having a first end and a second end, said flexible filament having a tensile strength of about 2-4 lbs; (b) an inserting element disposed at said first end, said inserting element being dimensioned to permit its insertion through a garment and, once inserted therethrough, to be retained by said garment; and (c) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through said garment.

According to another aspect of the invention, a plastic fastener is provided, said plastic fastener comprising (a) a flexible filament, said flexible filament having a first end and a second end, said flexible filament having a tensile strength of about 2 lbs., a length of approximately 4.3 mm, and a diameter of approximately 0.2 mm; (b) a first transverse bar disposed at said first end; and (c) a second transverse bar disposed at said second end; (d) wherein each of said first and second transverse bars has a length of approximately 1.8 mm, a width of approximately 0.5 mm and a height of approximately 0.5 mm.

According to still another aspect of the invention, a plastic fastener is provided, said plastic fastener comprising (a) a flexible filament, said flexible filament having a first end and a second end, said flexible filament having a length of approximately 3-5 mm; (b) an inserting element disposed at said first end, said inserting element being dimensioned to permit its insertion through a garment and, once inserted therethrough, to be retained by said garment; and (c) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through said garment.

It is another object of the present invention to provide a novel fastener clip.

Therefore, according to one aspect of the invention, a fastener clip is provided, said fastener clip comprising (a) a first fastener, said first fastener comprising a flexible filament having a first enlarged end and a second enlarged end, said flexible

filament having a length of approximately 3-5 mm; (b) a second fastener, said second fastener comprising a flexible filament having a first enlarged end and a second enlarged end, (c) said first fastener and said second fastener being arranged in a parallel, side-by-side, spaced relationship; (d) a first connector post connecting said first enlarged end of said first fastener to said first enlarged end of said second fastener, and (e) a second connector post connecting said second enlarged end of said second fastener to said second enlarged end of said second fastener.

According to another aspect of the invention, a fastener clip is provided, said fastener clip comprising (a) a first fastener, said first fastener comprising a flexible filament having a first enlarged end and a second enlarged end, said flexible filament having a tensile strength of approximately 2-4 lbs.; (b) a second fastener, said second fastener comprising a flexible filament having a first enlarged end and a second enlarged end; (c) said first fastener and said second fastener being arranged in a parallel, side-by-side, spaced relationship; (d) a first connector post connecting said first enlarged end of said first fastener to said first enlarged end of said second fastener; and (e) a second connector post connecting said second enlarged end of said second fastener to said second enlarged end of said second fastener.

According to still another aspect of the invention, a fastener clip is provided, said fastener clip comprising (a) a first fastener, said first fastener comprising a flexible filament having a first enlarged end and a second enlarged end, said flexible filament having a tensile strength of approximately 2 lbs. and a length of approximately 4.3 mm; (b) a second fastener, said second fastener comprising a flexible filament having a first enlarged end and a second enlarged end; (c) said first fastener and said second fastener being identical to one another and being arranged in a parallel, side-by-side, spaced relationship; (d) a first connector post connecting said first enlarged end of said first fastener to said first enlarged end of said second fastener; and (e) a second connector post connecting said second enlarged end of said second fastener to said second enlarged end of said second fastener.

According to still yet another aspect of the invention, a fastener clip is provided, said fastener clip comprising (a) a first fastener, said first fastener

comprising (i) a flexible filament having a first end and a second end, (ii) a first enlargement disposed at said first end, and (iii) a second enlargement disposed at said second end; (b) a third enlargement: said third enlargement being severably connected to said first enlargement; (c) a fourth enlargement, said fourth enlargement not being directly interconnected to said third enlargement, said fourth enlargement being severably connected to said second enlargement.

It is still yet another object of the present invention to provide a novel method of fastening objects.

Therefore, according to one aspect of the invention, there is provided a method of fixing an article of clothing to itself, said method comprising the steps of (a) providing a plastic fastener, said plastic fastener comprising (i) a flexible filament, said flexible filament having a first end, a second end, and a length, said length being suitable to fixedly retain the article of clothing against itself, (ii) an inserting element disposed at said first end, said inserting element being dimensioned to enable its insertion through the article of clothing and, once inserted therethrough, to be retained by the article of clothing, and (iii) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through the article of clothing; and (b) inserting said inserting element of said plastic fastener into and completely through the article of clothing at at least a pair of locations therein, with said retaining element not being inserted into the article of clothing.

According to another aspect of the invention, a method of fixing an article of commerce to a support is provided, said method comprising the steps of (a) providing a plastic fastener, said plastic fastener comprising (i) a flexible filament, said flexible filament having a first end, a second end and a length, said length being suitable to fixedly retain the article against the support, (ii) an inserting element disposed at said first end, said inserting element being dimensioned to enable its insertion through the article of commerce and the support and, once inserted therethrough, to be retained thereby, and (iii) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled

completely through the article of commerce and the support, and (b) inserting said inserting element of said plastic fastener into and completely through the article of commerce and the support, with said retaining element not being inserted into either the article or the support, in such a way as to fix the article of commerce to the support.

According to still another aspect of the invention, a method of coupling an article of commerce to a support is provided, said method comprising the steps of (a) providing a plastic fastener, said plastic fastener comprising (i) a flexible filament, said flexible filament having a first end, a second end, a tensile strength of approximately 2-4 lbs. and a length of approximately 3-5 mm; (ii) an inserting element disposed at said first end, said inserting element being dimensioned to enable its insertion through the article of commerce and the support and, once inserted therethrough, to be retained thereby, and (iii) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through the article of commerce and the support in the direction of said inserting element; and (b) inserting said inserting element of said plastic fastener into and completely through the article of commerce and the support.

According to still yet another aspect of the invention, a method of fixing together two elements is provided, said method comprising the steps of (a) providing a plastic fastener, said plastic fastener comprising (i) a flexible filament, said flexible filament having a first end, a second end, a length and a tensile strength, said length being suitable to fix the two elements together, said tensile strength being sufficiently strong to keep the two elements fixed together during normal handling and yet sufficiently weak to enable the two elements to be separated from one another without being damaged by said plastic fastener merely by having the two elements pulled away from each other until said flexible filament breaks, (ii) an inserting element disposed at said first end, said inserting element being dimensioned to enable its insertion through the two elements and, once inserted therethrough, to be retained by the two elements, and (iii) a retaining element disposed at said second

end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through the two elements, and (b) inserting said inserting element of said plastic fastener into and completely through the two elements, with said retaining element not being inserted into the two elements.

5 According to a further aspect of the invention, a method of coupling together two or more sheets of paper is provided, said method comprising the steps of (a) providing a plastic fastener, said plastic fastener comprising (i) a flexible filament, said flexible filament having a first end, a second end, a length and a tensile strength, said tensile strength being sufficiently strong to keep the sheets of paper coupled
10 together during normal handling and yet sufficiently weak to enable the sheets of paper to be separated from one another without being damaged by said plastic fastener merely by pulling the sheets of paper away from each other until said flexible filament breaks, (ii) an inserting element disposed at said first end, said inserting element being dimensioned to enable its insertion through the sheets of
15 paper and, once inserted therethrough, to be retained by the sheets of paper, and (iii) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through the sheets of paper; and (b) inserting said inserting element of said plastic fastener into and completely through the sheets of paper, with said retaining element not
20 being inserted into the sheets of paper.

It is still yet another object of the present invention to provide a novel fastener dispensing tool.

Therefore, according to one aspect of the invention, there is provided a hand-held fastener dispensing tool for dispensing a fastener of the type comprising a
25 flexible filament having an enlargement at one end thereof, said fastener dispensing tool comprising (a) a casing, said casing being provided with a needle opening; (b) a hollow, slotted needle, said hollow, slotted needle being slidably movable back and forth between a retracted position disposed entirely within said casing and an extended position extending through said needle opening, said hollow, slotted needle
30 being adapted to receive the enlargement of said fastener; (c) an ejector rod, said

ejector rod being slidably movable back and forth through said hollow, slotted needle to eject the enlargement disposed therein; and (d) an anvil coupled to said casing and extending in front of said needle opening, said anvil being positioned so that said hollow, slotted needle, when in said extended position, does not extend therebeyond.

5 According to another aspect of the invention, there is provided a fastener dispensing tool, said fastener dispensing tool comprising (a) a gun-shaped casing, said gun-shaped casing comprising a handle portion and a barrel portion, said barrel portion being provided with an opening; (b) a needle carrier, said needle carrier being slidably mounted in said barrel portion; (c) a hollow, slotted needle, said hollow,
10 slotted needle being coupled to said needle carrier and being insertable back and forth through said opening in said casing; (d) an ejector rod carrier, said ejector rod carrier being slidably mounted in said barrel portion; (e) an ejector rod, said ejector rod being coupled to said ejector rod carrier and being insertable back and forth through said hollow, slotted needle; (f) a linking member coupled to said needle
15 carrier and selectively engageable with said ejector rod carrier for coupling and decoupling said needle carrier to and from said ejector rod carrier so that said needle carrier is caused to slide back and forth in said barrel portion only during a portion of the movement of said ejector rod carrier; and (g) a triggering mechanism, said triggering mechanism comprising a trigger, said trigger being pivotally mounted in
20 said casing and extending partially through said handle portion thereof for manual actuation, said triggering mechanism further comprising a lever disposed within said casing, said lever being pivotally mounted at a first end on a first pin, said first pin being fixed to said trigger, said lever being pivotally mounted at a second end on a second pin, said second pin being fixed to said ejector rod carrier.

25 According to yet another aspect of the invention, there is provided a fastener dispensing tool for dispensing individual fasteners from a fastener clip, said fastener dispensing tool comprising (a) a casing, said casing being provided with an opening; (b) a hollow, slotted needle, said hollow, slotted needle being slidably movable back and forth through said opening in said casing; (c) an ejector rod, said ejector rod
30 being slidably movable back and forth through said hollow, slotted needle; and (d) a

feed guide, said feed guide being stationarily mounted in said casing behind said hollow, slotted needle, said feed guide defining a front portion of a feed track and comprising a stage at the end of said feed track off of which an individual fastener from a fastener clip is loaded into said hollow, slotted needle by said ejector rod.

5 According to still yet another aspect of the invention, there is provided a fastener dispensing tool for dispensing individual fasteners from a fastener clip, said fastener dispensing tool comprising (a) a casing, said casing being provided with an opening; (b) a hollow, slotted needle, said hollow, slotted needle being slidably movable back and forth between a retracted position and an extended position
10 extending through said opening in said casing; (c) an ejector rod, said ejector rod being slidably movable back and forth between a withdrawn position disposed behind said hollow, slotted needle and an advanced position extending through said hollow, slotted needle; (d) a trigger mechanically coupled to said casing; (e) first coupling means, coupling said trigger to said hollow, slotted needle, for moving said hollow,
15 slotted needle from said retracted position to said extended position and then back to said retracted position during a trigger stroke; and (f) second coupling means, coupling said trigger to said ejector rod, for moving said ejector rod from said withdrawn position to said advanced position and then back to said withdrawn position during a trigger stroke; (g) wherein said first coupling means and said second
20 coupling means are designed so that said ejector rod withdraws from said advanced position together with said hollow, slotted needle as said hollow, slotted needle moves from said extended position to said retracted position.

According to a further aspect of the invention, there is provided a fastener dispensing tool, said fastener dispensing tool comprising (a) a casing, said casing
25 being shaped to receive, entirely within said casing, a clip of fasteners, each of said fasteners in said clip comprising a flexible filament having a first enlarged portion at a first end thereof and a second enlarged portion at a second end thereof; (b) exactly one hollow, slotted needle coupled to said casing, said hollow, slotted needle being adapted to receive the first enlarged portion of a fastener; and (c) an ejector rod

disposed within said casing and insertable into said hollow, slotted needle for ejecting from said hollow, slotted needle an enlarged portion of a fastener disposed therein.

According to still a further aspect of the invention, there is provided a fastener dispensing tool, said fastener dispensing tool comprising (a) a casing, said casing being shaped to receive, entirely within said casing, a clip of fasteners, each of said fasteners in said clip comprising a flexible filament having a first enlarged portion at a first end thereof and a second enlarged portion at a second end thereof; (b) a hollow, slotted needle coupled to said casing, said hollow, slotted needle being adapted to receive the first enlarged portion of a fastener; (c) wherein said feed track terminates behind said hollow, slotted needle in a direction substantially perpendicular to the longitudinal axis of said hollow, slotted needle; and (d) an ejector rod disposed within said casing and insertable into said hollow, slotted needle for ejecting from said hollow, slotted needle an enlarged portion of a fastener disposed therein.

Additional objects, features, aspects and advantages of the present invention will be set forth, in part, in the description which follows and, in part, will be obvious from the description or may be learned by practice of the invention. In the description, reference is made to the accompanying drawings which form a part thereof and in which is shown by way of illustration specific embodiments for practicing the invention. These embodiments will be described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that other embodiments may be utilized and that structural changes may be made without departing from the scope of the invention. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is best defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are hereby incorporated into and constitute a part of this specification, illustrate preferred embodiments of the invention and, together with the description, serve to explain the principles of the invention. In the drawings wherein like reference numerals represent like parts:

Figs. 1(a) through 1(c) are side, top and front views, respectively, of one embodiment of a plastic fastener well-suited for maintaining a dress shirt in a folded condition in accordance with the teachings of the present invention;

Figs. 2(a) and 2(b) are partially-exploded perspective and partially-exploded side views, respectively, of one embodiment of a fastener clip constructed in accordance with the teachings of the present invention, the fastener clip including a plurality of the plastic fasteners shown in Figs. 1(a) through 1(c);

Figs. 3(a) through 3(c) are side, top and front views, respectively, of an individual fastener of the clip of Fig. 2, together with its associated connectors;

Figs. 4(a) through 4(c) are left side, front right top perspective and front views, respectively, of one embodiment of a fastener dispensing tool constructed according to the teachings of the present invention, the fastener dispensing tool being well-suited for use in dispensing individual fasteners from the clip of Fig. 2;

Fig. 5 is a rear, left, top, perspective view of the fastener dispensing tool of Figs. 4(a) through 4(c), with the left half of the casing not being shown;

Figs. 6(a) through 6(d) are front right bottom perspective, front left top perspective, enlarged left side and enlarged front views, respectively, of the right half of the casing of the tool shown in Figs. 4(a) through 4(c);

Figs. 7(a) through 7(d) are front left bottom perspective, front right top perspective, enlarged right side and enlarged front views, respectively, of the left half of the casing of the tool shown in Figs. 4(a) through 4(c);

Figs. 8(a) through 8(d) are front right top perspective, bottom, section and right views, respectively, of the cover of the tool shown in Figs. 4(a) through 4(c);

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Figs 9(a) through 9(d) are rear right top perspective, right side, rear and top perspective views, respectively, of the anvil of the tool shown in Figs. 4(a) through 4(c);

Figs. 10(a) through 10(c) are rear left top perspective, front right top perspective and right side views, respectively, of the needle shown in Fig 5,

Figs. 11(a) through 11(f) are front left top perspective, front right top perspective, rear right bottom perspective, top, front and section views, respectively, of the needle carrier shown in Fig 5,

Fig 12 is an enlarged perspective view of the locking pin shown in Fig. 5;

Fig. 13 is a left rear bottom perspective view of the tool shown in Fig. 5, with the left half of the casing, the needle carrier, the trigger and certain additional components not being shown for clarity;

Figs. 14(a) and 14(b) are front bottom left perspective and right side views, respectively, of the ejector rod carrier shown in Fig. 5;

Fig. 15 is a rear top right perspective view of the ejector clip shown in Fig. 5;

Fig. 16 is a rear top right perspective view of the linking member shown in Fig. 5;

Figs. 17(a) through 17(c) are front bottom right perspective, rear top left perspective and right side views, respectively, of the feed guide shown in Fig. 5;

Figs. 18(a) and 18(b) are front bottom right perspective and front views, respectively, of the feed clip shown in Fig. 13;

Fig. 19 is a front top right perspective view of the pawl shown in Fig. 13; and

Fig. 20 is a front bottom left perspective view of the feed sliding member shown in Fig. 13.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to Figs. 1(a) through 1(c), there are shown side, top and front views, respectively, of one embodiment of a plastic fastener well-suited for maintaining a dress shirt in a folded condition, said plastic fastener being constructed according to the teachings of the present invention and being represented generally by reference numeral 11. (It is to be understood that, although fastener 11 is particularly well-suited for maintaining a dress shirt or the like in a folded condition, it is not limited in its utility thereto and may be used in a variety of different applications including, but not limited to, fixing together pairs of socks, coupling together sheets of paper, fixing dress shirts to cardboard supports, fixing doll clothing to cardboard supports, etc.)

Fastener 11, which is a unitary structure preferably made by molding, comprises a flexible filament 13. When molded, filament 13 has a length l_1 of about 1.65 mm and a diameter d_1 of about 0.4 mm; filament 13 is thereafter stretched in the conventional manner to a length of approximately 4.3 mm and a diameter of approximately 0.2 mm. It should be noted that, even though, in the present embodiment, filament 13 has a generally cylindrical shape, filament 13 need not be cylindrically shaped and may take a variety of shapes, including those specified in commonly-assigned co-pending U.S. Patent Application Serial No. 09/416,784.

Fastener 11 also comprises a first cross-bar 15 and a second cross-bar 17, cross-bar 15 being disposed at a first end of filament 13, cross-bar 17 being disposed at a second end of filament 13, cross-bars 15 and 17 being parallel to one another. Each of cross-bars 15 and 17 has a length l_2 of approximately 1.78 mm, a width w_1 of approximately 0.55 mm and a height h_1 of approximately 0.55 mm. It should be noted that, even though, in the present embodiment, cross-bars 15 and 17 are shaped so as to have flat inner surfaces 15-1 and 17-1, respectively, proximate to filament 13 and convex outer surfaces 15-2 and 17-2, respectively, distal to filament 13, cross-bars 15 and 17 need not be so shaped. In fact, cross-bars 15 and 17 may take a variety of forms, including those of the enlarged ends described in U.S. Patent Application Serial No. 09/416,784.

Fastener 11 is preferably made of a polyurethane that gives filament 13 a tensile strength of about 2 pounds. However, it is to be noted that said polyurethane is not the only type of material of which fastener 11 may be made and that other plastic materials (or combinations of materials) capable of providing filament 13 with a tensile strength in the range of about 2-4 pounds (or whatever tensile strength is desirable based upon the particular use to which fastener 11 is put) are also suitable for purposes of the present invention. It is to be noted that, because filament 13 is made of a polyurethane, it has a certain degree of elasticity - a property which may be desirable in certain applications.

Referring now to Figs. 2(a) and 2(b), there are shown partially-exploded perspective and partially-exploded side views, respectively, of one embodiment of a fastener clip constructed according to the teachings of the present invention, the fastener clip being represented generally by reference numeral 31.

Clip 31, which is a unitary structure preferably made by molding, comprises a plurality of fasteners 11-1 through 11-3, fasteners 11 being arranged in a parallel, side-by-side, spaced orientation. Although only three fasteners 11 are shown in clip 31, it is to be understood that the number of fasteners 11 in clip 31 is illustrative only and could be increased or decreased without departing from the spirit or scope of the present invention. (In fact, in a preferred embodiment, clip 31 comprises one hundred twenty-five fasteners 11.)

Clip 31 also includes a first plurality of severable connector posts 33-1 and 33-2 and a second plurality of severable connector posts 35-1 and 35-2, connector posts 33 connecting the mutually-opposing sides of adjacent cross-bars 15 at their approximate midpoints and extending in a substantially perpendicular direction relative to the longitudinal axes of cross-bars 15, connector posts 35 connecting the mutually-opposing sides of adjacent cross-bars 17 at their approximate midpoints and extending in a substantially perpendicular direction relative to the longitudinal axes of cross-bars 17. (Side, top and front views of an individual fastener 11, together with its associated connector posts 33 and 35, are shown in Figs. 3(a) through 3(c),

respectively.) In the present embodiment, connector posts 33 and 35 have a length of approximately 0.25 mm.

Connector posts 33 and 35 are strong enough to maintain the connection between adjacent fasteners 11 in clip 31 prior to the dispensing of individual fasteners 11 from clip 31 and, yet, are weak enough to be severed by the conventional severing action of a fastener dispensing tool. At the same time, connector posts 33 and 35 have a certain degree of flexibility; consequently, because of the arrangement of posts 33 and 35 relative to cross-bars 15 and 17, respectively, adjacent fasteners 11 in clip 31 are permitted to pivot relative to one another, thereby enabling clip 31 to be bent into an arcuate shape.

As seen best in Fig. 2(b), posts 33 and 35 preferably have a conical or tapered transverse cross-section that decreases in diameter from the fastener about to be dispensed (e.g., fastener 11-1) to the next fastener in the clip 31 (e.g., fastener 11-2) so that very little or nothing of the severed posts 33 and 35 that once connected the fastener about to be dispensed to the fastener previously attached to it remain on the about-to-be-dispensed fastener. In this manner, as will be seen below, the fastener about to be dispensed by the tool (e.g., fastener 11-1) is able to sit substantially flush within a tool used to dispense the fastener. It should be understood, however, that the above embodiment is merely a preferred embodiment and that posts 33 and 35 need not be conical or tapered and, instead, may take a variety of shapes.

Clip 31 further includes an extra pair of cross-bars 37 and 39, cross-bars 37 and 39 being identical to cross-bars 15 and 17, respectively, except for the fact that cross-bars 37 and 39 are not disposed at the ends of a flexible filament. Cross-bars 37 and 39 are arranged in a parallel, side-by-side, spaced orientation from cross-bars 15 and 17, respectively, of the last fastener 11 of clip 31 (in the present embodiment, fastener 11-3) and are severably connected thereto by connector posts 33-3 and 35-3, respectively. Connector post 33-3 is identical to connector posts 33-1 and 33-2, and connector post 35-3 is identical to connector posts 35-1 and 35-2. Cross-bars 37 and 39 serve to keep the last fastener of clip 31 properly oriented while it is being dispensed using the fastener dispensing tool described below.

covers an opening formed between recesses 55-1 and 57-1 located along the top edges of halves 55 and 57, respectively (recesses 55-1 and 57-1 seen best in Figs. 6(d) and 7(d), respectively). For reasons to be revealed below, the rear end 69-1 of door 69 is angled upwardly to permit limited access to the interior of casing 53 through an opening 68 even when door 69 is in a closed position. When door 69 is pivoted away from the top of casing 53, the interior of barrel portion 61 (and in particular the feed track to be described below of casing 53) can be accessed.

As seen best in Fig. 5, a ring 71, which is preferably made of rubber or the like, is rotatably mounted on a pin 72 fixed to door 69. Ring 71 is adapted to engage the filament portions of a clip 31 disposed within tool 51 in such a way as to permit manual advancement of a clip 31 through the feed track of tool 51 merely by turning ring 71 from the exterior of casing 53.

Tool 51 further comprises an anvil 73 (shown separately in Figs. 9(a) through 9(d)). Anvil 73, which is preferably made of molded plastic or the like, includes a rear portion 73-1 and a front portion 73-2. Rear portion 73-1 is disposed within barrel portion 61 of casing 53 and is secured to halves 55 and 57 by screw 70 (anvil 73 sharing screw 70 with door 69). Hooked front portion 73-2 extends upwardly from the top of casing 53 and then loops downwardly in front of tool 51 spaced a short distance from opening 62. Front portion 73-2 is provided with an opening 75, which is aligned with opening 62 and which is appropriately spaced from tool 51 so as to receive the tip of the needle of tool 51. Front portion 73-2 is also provided with an outer slot 77 which is preferably dimensioned depthwise to extend beyond the tip of the needle in its forwardmost position and is preferably dimensioned widthwise to prevent a user from inserting his fingers thereinto. In this manner, anvil 73 not only serves as a support for the fastening operation to be performed by tool 51 but also serves to protect a user from injury caused by accidental needle sticks. As a further safety measure, the spacing between opening 62 of tool and opening 75 of anvil 73 is preferably sufficiently small (e.g., 0.25-0.3 inch) to prevent a user from inserting his fingers therebetween.

As can readily be appreciated, because anvil 73 is secured to casing 53 by screw 70, anvil 73 can easily be replaced if damaged. Also, anvil 73 can readily be replaced with an anvil having a different sized loop if one wishes to vary the point of attachment of the fastener dispensed by tool 51 into an object (i.e., generally speaking, the higher the loop, the lower the point of attachment of the fastener into the object).

As seen best in Fig. 5, tool 51 also includes a triggering mechanism whose purpose will become apparent below. In the present embodiment, said triggering mechanism includes a trigger 81. Trigger 81, which may be made of molded plastic or another similarly suitable material, is pivotally attached to casing 53 by a pin 83 and extends partially through an opening 84 formed in handle portion 59 of casing 53 so that it may be digitally manipulated for movement towards and away from, respectively, the rear wall of handle portion 59. A coiled spring 85, which is attached at one end to the inside rear wall of handle portion 59 and which is attached at its opposite end to the inside of trigger 81, biases trigger 81 away from the rear wall of handle portion 59.

The triggering mechanism of tool 51 additionally includes a lever 87 and a float link 89, both of which may be made of molded plastic or another suitable material. Lever 87 is disposed within casing 53 and is pivotally mounted at a first end 87-1 on a pin 88, pin 88 being fixed to trigger 81. Float link 89 is pivotally mounted at one end on a pin 90 mounted inside handle portion 59 and is pivotally mounted at its opposite end on a pin 91 fixed to an intermediate portion of lever 87.

Tool 51 further includes a needle assembly. In the present embodiment, said needle assembly comprises a needle 93. As seen best in Figs. 10(a) through 10(c), needle 93 comprises a stem portion 95 and a base portion 97. Stem portion 95, which may be made from stamped and rolled metal, is a generally cylindrical member terminating at one end in a sharp tip 95-1 designed for insertion through a garment or like object. Stem portion 95 also has a slotted bore 95-2 extending substantially longitudinally thereacross. Base portion 97 may be made of a plastic that has been insert-molded onto that end of stem portion 95 that is distal to tip 95-1. (Alternatively,

stem portion 95 and base portion 97 may be a unitary structure made of metal or another suitable material.) Base portion 97 is provided with a slotted longitudinal bore 97-1 that is aligned with bore 95-2 of stem portion 95 and is also provided with a scallop-shaped recess 99 on its outer surface whose purpose will be described below. The bores of stem portion 95 and base portion 97 are appropriately dimensioned so that cross-bar 15 of a fastener 11 may be inserted therein from the rear of base portion 97, traverse the length of needle 93 through bore 95-2 and then exit needle 93 via tip 95-1. The slots of stem portion 95 and base portion 97 are appropriately dimensioned to permit the filament 13 of fastener 11 to extend therethrough while its associated cross-bar 15 is disposed within needle 93, said slots being oriented in tool 51 so as to face towards half 55 of casing 53.

Referring back to Fig. 5, the needle assembly of tool 51 further comprises a needle carrier 101 (shown separately in Figs. 11(a) through 11(f)), needle carrier 101 being slidably mounted in a slot 102 defined at least in part by matching sets of longitudinally extending ribs 104-1/104-2 and 106-1/106-2 integrally formed on right half 55 and left half 57, respectively, of casing 53 (ribs 106-1 and 106-2 being visible in Figs. 7(b) and 7(c)). One end of a spring 108 is attached to a post 110 formed on needle carrier 101, the opposite end of spring 108 being attached to a post 112 mounted in casing 53. In this manner, needle carrier 101 is normally biased rearwardly in barrel portion 61. Needle carrier 101, which may be made of molded plastic or another suitable material, is provided at its front end with a sleeve 107, sleeve 107 being aligned with opening 62 for reasons to become apparent below. Base portion 97 of needle 93 is disposed within sleeve 107 and is lockably secured therewithin by a locking pin 109.

Referring now to Fig. 12, locking pin 109 can be seen to be a generally cylindrical member having a slotted head 111 (manipulable with a screwdriver or the like) at one end thereof, a longitudinally-extending slot 113 at the opposite end thereof and a scallop-shaped recess 115 on its outer surface at about its midpoint. Recess 115 on pin 109 is appropriately dimensioned to receive base portion 97 of

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needle 93, and recess 99 of base portion 97 is appropriately dimensioned to receive pin 109.

Locking pin 109 is disposed in a bore 117 formed in carrier 101, bore 117 being shown in Figs. 11(a) through 11(d) and in Fig 11(f). As seen best in Fig. 11(f),
 5 bore 117 and sleeve 107 are oriented relative to one another so that, when pin 109 is rotationally positioned so that recess 115 faces away from needle 93, needle 93 is engaged by pin 109 and, therefore, is locked into sleeve 107 whereas, when pin 109 is rotationally positioned so that recess 115 faces towards needle 93, needle 93 is not engaged by pin 109 and, therefore, is free to be removed from sleeve 107. As
 10 can be seen in Fig. 5, slotted head 111 of locking pin 109 is accessible (for use in locking and unlocking needle 93) through an opening 119 formed in the bottom of barrel portion 61.

Referring now to Figs. 5 and 13, tool 51 further includes a mechanism for loading fasteners, one at a time, into needle 93 and for ejecting loaded fasteners from
 15 needle 93. In the present embodiment, said loading/ejecting mechanism comprises an ejector rod carrier 141, an ejector rod 143 and an ejector clip 145. Ejector rod carrier 141 (shown separately in Figs. 14(a) and 14(b)), which may be made of molded plastic or another suitable material, is slidably mounted on the underside of needle carrier 101. Ejector rod carrier 141 is coupled to lever 87 by means of a pin
 20 147 that is fixed to ejector rod carrier 141, lever 87 being pivotally mounted on pin 147. In this manner, when trigger 81 is squeezed, ejector rod carrier 141 is moved forwardly across barrel portion 61; conversely, when trigger 81 is released, ejector rod carrier 141 is moved rearwardly across barrel portion 61. For reasons to be discussed below, the top of carrier 141 is shaped to include a first recessed portion
 25 149-1 at its front end and a second recessed portion 149-2 proximate to its rear end.

Ejector rod 143 is preferably conventional in shape and composition. The rear end of ejector rod 143 is mounted in the front end of carrier 141, the front end of ejector rod 143 extending forwardly away from carrier 141 and being aligned with bore 97-1 of needle 93. In this manner, when trigger 81 is squeezed, ejector rod
 30 carrier 141 and ejector rod 143 together move forwardly through barrel portion 61

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until the front end of ejector rod 143 is inserted completely through needle 93. Because, as will hereinafter be described, the cross-bar 15 of the lead fastener 11 of a fastener clip 31 loaded in tool 51 is positioned behind bore 97-1 of needle 93, as the front end of ejector rod 143 moves forwardly through barrel portion 61, it pushes said cross-bar into and through needle 93, in the process severing the connector 33 between said cross-bar and its adjacent cross-bar 15.

Ejector clip 145, which is shown separately in Fig. 15, is preferably a unitary structure made of stamped stainless steel or the like. Clip 145, which is positioned between the right side of ejector carrier 141 and the inner right side of needle carrier 101, is shaped to include a front portion 151-1 and a rear portion 151-2. Front portion 151-1 is provided with a tip 152, tip 152 being aligned with cross-bar 17 of the lead fastener 11. Rear portion 151-2 is provided with an elongated slot 153 through which pin 147 extends. As can be seen best in Fig. 15, the rear end 153-1 of slot 153 is angled upwardly. In this manner, as ejector rod carrier 141 begins its forward movement through barrel portion 61 and as the front end of ejector rod 143 pushes cross-bar 15 of the lead fastener into needle 93, pin 147 begins to move forwardly through slot 153 from rear end 153-1, causing clip 145 to be moved forwardly a short distance and causing tip 152 of clip 145 to engage cross-bar 17 of the lead fastener and to push it forwardly until the connector 35 connecting cross-bar 17 to the remainder of the clip 31 breaks. As carrier 141 continues to move forwardly, pin 147 moves through the straight front end 153-2 of slot, causing clip 145 to remain stationary while carrier 141 moves forwardly. Later, as carrier 141 makes its rearward movement through barrel portion 61 (as trigger 81 is released), pin 147 moves rearwardly through slot 153, and clip 145 is restored to its original position.

Referring back to Figs 5 and 13, tool 51 further comprises a mechanism for coupling and decoupling ejector rod carrier 141 to and from needle carrier 101. In the present embodiment, said mechanism comprises a linking member 161 (shown separately in Fig. 16). Linking member 161, which may be made of molded plastic or a similarly suitable material, is seated in a slot 142 (shown best in Figs. 11(a) and

11(b)) formed in needle carrier 101 and is pivotally mounted at one end 161-1 to needle carrier 101 by a pin 163.

As seen best in Fig 13, the front end 161-2 of linking member 161 is enlarged and, prior to actuation of trigger 81, is disposed over the recessed portion 149-1 of carrier 141. When trigger 81 is first squeezed, carrier 141 moves forwardly; however, because of recessed portion 149-1, carrier 141 does not initially engage the enlarged front end 161-2 of linking member 161. As a result, linking member 161 and, in turn, needle carrier 101 are not initially coupled to carrier 141 and do not initially move forwardly with carrier 141. During the aforementioned part of the trigger stroke, ejector rod 143 severs the lead cross-bar 15 from its adjacent cross-bar 15 and feeds the lead cross-bar 15 into needle 93.

Continued squeezing of trigger 81 causes that portion of carrier 141 located immediately behind recessed portion 149-1 to pivot front end 161-2 of linking member 161 up against rib 104-1, thereby causing linking member 161 and, in turn, needle carrier 101 to be coupled to carrier 141. Thus, once coupled together, carrier 101, linking member 161 and carrier 141 begin to move forwardly together through slot 102. During this part of the trigger stroke, needle 93 and ejector rod 143 move together, with tip 95-1 of needle 93 passing through opening 62 of casing 53 and through opening 75 of anvil 73.

Further continued squeezing of trigger 81 causes linking member 161 and carrier 141 to be decoupled as front end 161-2 of linking member 161 arrives at and is forced through an opening 165 formed in rib 104-1 (a corresponding opening being provided in rib 106-1) while carrier 141 continues to move forwardly through barrel portion 61. During this part of the trigger stroke, ejector rod 143 continues to move forwardly through the now-stationary needle 93.

Still further continued squeezing of trigger 81 causes ejector carrier 141 to slide across the now-stationary enlarged end 161-2 of member 161 until enlarged end 161-2 drops down into recessed portion 149-2 of carrier 141. During this part of the trigger stroke, ejector rod 143 completes its forward progress through needle 93.

When trigger 81 is initially released, carrier 141 and member 161 move rearwardly together (with enlarged end 161-2 disposed in recessed portion 149-2 and pressed up against rib 104-1) until member 161 is fully withdrawn and enlarged end 161-2 is aligned with an opening 166 in rib 104-1 (a corresponding opening being provided in rib 106-1). During this part of the trigger stroke, ejector rod 143 and needle 93 move rearwardly together, with needle 93 being completely withdrawn into casing 53 through opening 62. The primary reason for having needle 93 and ejector rod 143 simultaneously withdraw at the beginning of the trigger release, instead of simply reversing the sequence of events that took place during the squeezing of trigger 81 (which would involve having ejector rod 143 first retract partially while needle 93 is kept stationary), is to prevent the cross-bar 15 that is being dispensed through needle 93 from toggling back into the needle 93 after retraction of ejector rod 143. This undesired outcome is prevented in the present arrangement by having needle 93 and ejector rod 143 retract together until needle 93 has fully retracted.

Continued release of trigger 81 causes carrier 141 to slide rearwardly across the now-stationary enlarged end 161-2 until carrier 141 is fully withdrawn and enlarged end 161-2 is returned to its starting position over recessed portion 149-1. During this part of the trigger stroke, ejector rod 143 fully retracts.

Tool 51 further comprises a feed track 171 along which a fastener clip 31 may be advanced through tool 51 to a position where individual fasteners can be loaded into and dispensed from needle 93. Feed track 171, which extends from the rear of opening 68 to just behind bore 97-1 of needle 93, is defined, in part, by a matching pair of arcuate ribs 173-1 and 173-2 formed interiorly along the barrel portion of halves 55 and 57, respectively, and is defined, in part, by a feed guide 175 (shown separately in Figs. 17(a) through 17(c)) stationarily mounted in barrel portion 61 just behind needle 93. Feed track 171 is appropriately dimensioned so that the entirety of a clip analogous to clip 31 but comprising one hundred twenty-five fasteners 11 can be completely contained within tool 51. As can readily be appreciated, even longer fastener clips (e.g., clips having several hundred fasteners 11) can be

disposed in feed track 171, with the rear end of such clips extending out through opening 68 of tool 51.

Referring now to Figs. 17(a) through 17(c), feed guide 175, which is preferably a unitary structure made of molded plastic or the like, is shaped to include a front portion 177-1, a rear portion 177-2 and an intermediate portion 177-3. Front portion 177-1 is provided with a slotted bore 179, which is aligned with bore 97-1 of needle 93 and which is also aligned with ejector rod 143, and is also provided with a slot 180, which is aligned with tip 152 of clip 145. In addition, the front surface of front portion 177-1 is shaped to include a recessed area 181, which is adapted to receive the rear of base portion 97 of needle 93 as needle 93 is moved back and forth by needle carrier 101. Furthermore, the rear surface of front 177-1 is shaped to include a guide rib 183, guide rib 183 being positioned in feed track 171 and being appropriately dimensioned to keep cross-bars 15 and 17 properly aligned on opposite sides thereof as a clip 31 travels downwardly through feed track 171. A downwardly and outwardly angled bump 183-1 is provided on rib 183, bump 183-1 being positioned on rib 183 and appropriately dimensioned so that the filament 15 of the lead fastener 11 slides thereacross as said fastener moves into position to be dispensed but, once drawn past bump 183-1, cannot easily be pulled back thereover. In this manner, bump 183-1 acts as an anti-back to prevent a clip 31 from moving backwards in feed track 171 during the as yet to be described feeding operation of the clip.

The top surface of intermediate portion 177-3 constitutes the front end of feed track 171 and functions as a stage on which the lead fastener 11 of clip 31 is situated prior to being dispensed by tool 51.

A pair of transverse openings 185-1 and 185-2 are provided in rear portion 177-2 of guide 175, opening 185-1 being positioned so that it is aligned both with ejector rod 143 and with bore 179, opening 185-2 being positioned so that it is aligned with tip 152 of clip 145 and with slot 180.

As cross-bar 15 of the lead fastener 11 is pushed by ejector rod 143 through opening 179, the severable connector 33 connecting said cross-bar 15 to its adjacent cross-bar 17 is severed. Likewise, as cross-bar 17 of the lead fastener 11

appropriately positioned on member 199 so that, when trigger 81 is nearly completely squeezed, lever 87 contacts post 209 and moves member 199 forwardly a short distance. This causes pawl 193 to rotate away from the fasteners positioned in guide 175. Then, when trigger 81 is released, lever 87 contacts post 207 and moves
5 member 199 rearwardly a short distance. This causes pawl 193 to rotate towards the fasteners positioned in guide 175, whereby fingers 194-1 and 194-2 engage the filament portion of the clip and pull the clip down to advance it by one fastener.

To prepare tool 51 for use, clip 31 (or more preferably a fastener clip analogous to clip 31 but comprising on the order of one hundred twenty-five fasteners
10 11) is loaded into tool 51. This is typically done by opening door 69, inserting the clip into feed track 171 (i.e., by orienting the clip relative to ribs 173-1 and 173-2 so that the respective filaments 15 are disposed on top of and across ribs 173-1 and 173-2 and so that the respective cross-bars 15 and 17 are positioned off to the sides of and perpendicular to ribs 173-1 and 173-2), closing door 69, and advancing the clip
15 through feed track 171 using wheel 71. With tool 51 thus loaded, a fastener 11 may be inserted into a desired article first by placing the article between opening 62 in casing 53 and opening 75 in anvil 73 (arrows 67-1 and 67-2 optionally being used to locate openings 62 and 75) and then by squeezing and releasing trigger 81 in the manner described above.

20 The embodiments of the present invention recited herein are intended to be merely exemplary and those skilled in the art will be able to make numerous variations and modifications to it without departing from the spirit of the present invention. All such variations and modifications are intended to be within the scope of the present invention as defined by the claims appended hereto.

WHAT IS CLAIMED IS:

1 A plastic fastener comprising:

(a) a flexible filament, said flexible filament having a first end and a second end, said flexible filament having a tensile strength of about 2-4 lbs;

5 (b) an inserting element disposed at said first end, said inserting element being dimensioned to permit its insertion through a garment and, once inserted therethrough, to be retained by said garment; and

(c) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled
10 completely through said garment.

2. The plastic fastener as claimed in claim 1 wherein said flexible filament, said inserting element and said retaining element form a unitary structure made of polyurethane.

3. The plastic fastener as claimed in claim 1 wherein said flexible filament has
15 a tensile strength of approximately 2 lbs.

4. The plastic fastener as claimed in claim 3 wherein said flexible filament has a length of approximately 3-5 mm.

5. The plastic fastener as claimed in claim 4 wherein said flexible filament has a length of approximately 4.3 mm.

20 6. The plastic fastener as claimed in claim 3 wherein said flexible filament has a diameter of approximately 0.2 mm.

7. The plastic fastener as claimed in claim 3 wherein said inserting element is a first transverse bar and wherein said retaining element is a second transverse bar.

25 8. The plastic fastener as claimed in claim 7 wherein said first transverse bar and said second transverse bar are parallel to one another.

9. The plastic fastener as claimed in claim 7 wherein each of said first and second transverse bars has a length of approximately 1.8 mm.

30 10. The plastic fastener as claimed in claim 7 wherein each of said first and second transverse bars has a width of approximately 0.5 mm.

11 The plastic fastener as claimed in claim 7 wherein each of said first and second transverse bars has a height of approximately 0.5 mm.

12. The plastic fastener as claimed in claim 7 wherein each of said first and second transverse bars has a flat inner surface proximate to said flexible filament and
5 a convex outer surface distal to said flexible filament

13. A plastic fastener comprising.

(a) a flexible filament, said flexible filament having a first end and a second end, said flexible filament having a tensile strength of about 2 lbs., a length of approximately 4.3 mm, and a diameter of approximately 0.2 mm;

10 (b) a first transverse bar disposed at said first end; and

(c) a second transverse bar disposed at said second end;

(d) wherein each of said first and second transverse bars has a length of approximately 1.8 mm, a width of approximately 0.5 mm and a height of approximately 0.5 mm.

15 14. The plastic fastener as claimed in claim 13 wherein said flexible filament, said first transverse bar and said second transverse bar form a unitary structure made of polyurethane.

15. The plastic fastener as claimed in claim 14 wherein said first transverse bar and said second transverse bar are parallel to one another.

20 16. The plastic fastener as claimed in claim 15 wherein each of said first and second transverse bars has a flat inner surface proximate to said flexible filament and a convex outer surface distal to said flexible filament.

17. A plastic fastener comprising:

25 (a) a flexible filament, said flexible filament having a first end and a second end, said flexible filament having a length of approximately 3-5 mm;

(b) an inserting element disposed at said first end, said inserting element being dimensioned to permit its insertion through a garment and, once inserted therethrough, to be retained by said garment; and

(c) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through said garment

18. The plastic fastener as claimed in claim 17 wherein said inserting element
5 is a first transverse bar and said retaining element is a second transverse bar.

19. The plastic fastener as claimed in claim 17 wherein said flexible filament has a length of approximately 4.3 mm.

20. The plastic fastener as claimed in claim 19 wherein said flexible filament has a diameter of approximately 0.2 mm.

10 21. The plastic fastener as claimed in claim 20 wherein said inserting element is a first transverse bar and said retaining element is a second transverse bar and wherein each of said first and second transverse bars has a length of approximately 1.8 mm, a width of approximately 0.5 mm and a height of approximately 0.5 mm.

15 22. The plastic fastener as claimed in claim 21 wherein each of said first and second transverse bars has a flat inner surface proximate to said flexible filament and a convex outer surface distal to said flexible filament.

23. The plastic fastener as claimed in claim 22 wherein said flexible filament has a tensile strength of approximately 2 lbs.

24. A fastener clip comprising:

20 (a) a first fastener, said first fastener comprising a flexible filament having a first enlarged end and a second enlarged end, said flexible filament having a length of approximately 3-5 mm;

(b) a second fastener, said second fastener comprising a flexible filament having a first enlarged end and a second enlarged end;

25 (c) said first fastener and said second fastener being arranged in a parallel, side-by-side, spaced relationship;

(d) a first connector post connecting said first enlarged end of said first fastener to said first enlarged end of said second fastener, and

30 (e) a second connector post connecting said second enlarged end of said second fastener to said second enlarged end of said second fastener.

34 The fastener clip as claimed in claim 31 wherein said first fastener and said second fastener are interconnected only by said first connector post and said second connector post

35 The fastener clip as claimed in claim 31 wherein said first fastener and said second fastener are further interconnected by a runner bar, said runner bar being severably connected to each of said first fastener and said second fastener.

36 The fastener clip as claimed in claim 31 wherein said flexible filament of each of said first fastener and said second fastener has a tensile strength of about 2 lbs.

37 A fastener clip comprising:

(a) a first fastener, said first fastener comprising a flexible filament having a first enlarged end and a second enlarged end, said flexible filament having a tensile strength of approximately 2-4 lbs.;

(b) a second fastener, said second fastener comprising a flexible filament having a first enlarged end and a second enlarged end;

(c) said first fastener and said second fastener being arranged in a parallel, side-by-side, spaced relationship;

(d) a first connector post connecting said first enlarged end of said first fastener to said first enlarged end of said second fastener; and

(e) a second connector post connecting said second enlarged end of said second fastener to said second enlarged end of said second fastener.

38 The fastener clip as claimed in claim 37 wherein said flexible filament of said first fastener has a length of approximately 3-5 mm.

39 The fastener clip as claimed in claim 37 wherein said flexible filament of said first fastener has a length of approximately 4.3 mm.

40 The fastener clip as claimed in claim 37 wherein each of said first enlarged end and said second enlarged end of said first fastener and said first enlarged end and said second enlarged end of said second fastener is a transverse bar.

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41. The fastener clip as claimed in claim 40 wherein said first fastener and said second fastener are identical in shape and size

42. The fastener clip as claimed in claim 41 wherein said first fastener, said second fastener, said first connector post and said second connector post form a unitary structure.

43. The fastener clip as claimed in claim 42 wherein said unitary structure is made of polyurethane.

44. The fastener clip as claimed in claim 41 wherein each of said first connector post and said second connector post extends transversely relative to said first and second enlarged ends, respectively.

45. The fastener clip as claimed in claim 44 wherein said first connector post is disposed at the approximate midpoints of mutually-opposing sides of said first enlarged end of said first fastener and said first enlarged end of said second fastener and wherein said second connector post is disposed at the approximate midpoints of mutually-opposing sides of said second enlarged end of said first fastener and said second enlarged end of said second fastener.

46. The fastener clip as claimed in claim 45 wherein each of said first and second connector posts tapers in transverse cross-sectional diameter as it extends from said second fastener to said first fastener.

47. The fastener clip as claimed in claim 45 wherein said first connector post is sufficiently flexible to permit said first enlarged ends of said first and second fasteners to pivot relative to one another and wherein said second connector post is sufficiently flexible to permit said second enlarged ends of said first and second fasteners to pivot relative to one another.

48. The fastener clip as claimed in claim 45 wherein said first fastener and said second fastener are interconnected only by said first connector post and said second connector post.

49. The fastener clip as claimed in claim 45 wherein said first fastener and said second fastener are further interconnected by a runner bar, said runner bar being severably connected to each of said first fastener and said second fastener.

50 The fastener clip as claimed in claim 37 wherein said flexible filament of each of said first fastener and said second fastener has a tensile strength of about 2 lbs.

51 A fastener clip comprising:

5 (a) a first fastener, said first fastener comprising a flexible filament having a first enlarged end and a second enlarged end, said flexible filament having a tensile strength of approximately 2 lbs. and a length of approximately 4.3 mm;

(b) a second fastener, said second fastener comprising a flexible filament having a first enlarged end and a second enlarged end;

10 (c) said first fastener and said second fastener being identical to one another and being arranged in a parallel, side-by-side, spaced relationship;

(d) a first connector post connecting said first enlarged end of said first fastener to said first enlarged end of said second fastener; and

15 (e) a second connector post connecting said second enlarged end of said second fastener to said second enlarged end of said second fastener.

52. The fastener clip as claimed in claim 51 wherein each of said first enlarged ends is a transverse bar and wherein each of said second enlarged ends is a transverse bar.

20 53. The fastener clip as claimed in claim 52 wherein each of said first connector post and said second connector post extends transversely relative to said first and second enlarged ends, respectively.

25 54. The fastener clip as claimed in claim 53 wherein said first connector post is disposed at the approximate midpoints of mutually-opposing sides of said first enlarged end of said first fastener and said first enlarged end of said second fastener and wherein said second connector post is disposed at the approximate midpoints of mutually-opposing sides of said second enlarged end of said first fastener and said second enlarged end of said second fastener.

30 55. The fastener clip as claimed in claim 54 wherein each of said first and second connector posts tapers in transverse cross-sectional diameter as it extends from said second fastener to said first fastener.

56. The fastener clip as claimed in claim 54 wherein said first connector post is sufficiently flexible to permit said first enlarged ends of said first and second fasteners to pivot relative to one another and wherein said second connector post is sufficiently flexible to permit said second enlarged ends of said first and second fasteners to pivot relative to one another.

57. The fastener clip as claimed in claim 54 wherein said first fastener and said second fastener are interconnected only by said first connector post and said second connector post.

58. The fastener clip as claimed in claim 54 wherein said first fastener and said second fastener are further interconnected by a runner bar, said runner bar being severably connected to each of said first fastener and said second fastener.

59. The fastener clip as claimed in claim 54 wherein said flexible filament has a diameter of approximately 0.2 mm.

60. A method of fixing an article of clothing to itself, said method comprising the steps of:

(a) providing a plastic fastener, said plastic fastener comprising

(i) a flexible filament, said flexible filament having a first end, a second end, and a length, said length being suitable to fixedly retain the article of clothing against itself,

(ii) an inserting element disposed at said first end, said inserting element being dimensioned to enable its insertion through the article of clothing and, once inserted therethrough, to be retained by the article of clothing, and

(iii) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through the article of clothing; and

(b) inserting said inserting element of said plastic fastener into and completely through the article of clothing at at least a pair of locations therein, with said retaining element not being inserted into the article of clothing.

61. The method as claimed in claim 60 wherein said flexible filament has a tensile strength of 2-4 lbs.

62 The method as claimed in claim 61 wherein said flexible filament has a tensile strength of 2 lbs.

63. The method as claimed in claim 60 wherein said flexible filament has a length of approximately 3-5 mm.

64. The method as claimed in claim 63 wherein said flexible filament has a length of approximately 4.3 mm.

65. The method as claimed in claim 60 wherein the article of clothing is a dress shirt and wherein said flexible filament has a tensile strength of 2-4 lbs. and a length of approximately 3-5 mm.

66. The method as claimed in claim 65 wherein said flexible filament has a tensile strength of 2 lbs. and a length of approximately 4.3 mm.

67. A method of fixing an article of commerce to a support, said method comprising the steps of:

(a) providing a plastic fastener, said plastic fastener comprising

(i) a flexible filament, said flexible filament having a first end, a second end and a length, said length being suitable to fixedly retain the article of commerce against the support,

(ii) an inserting element disposed at said first end, said inserting element being dimensioned to enable its insertion through the article of commerce and the support and, once inserted therethrough, to be retained thereby, and

(iii) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through the article of commerce and the support; and

(b) inserting said inserting element of said plastic fastener into and completely through the article of commerce and the support, with said retaining element not being inserted into either the article or the support, in such a way as to fix the article of commerce to the support.

68. The method as claimed in claim 67 wherein the article of commerce is a dress shirt and wherein the support is a cardboard backing.

69. The method as claimed in claim 68 wherein said flexible filament has a tensile strength of 2-4 lbs

70. The method as claimed in claim 69 wherein said flexible filament has a tensile strength of 2 lbs.

5 71. The method as claimed in claim 70 wherein said flexible filament has a length of approximately 3-5 mm.

72. The method as claimed in claim 71 wherein said flexible filament has a length of approximately 4.3 mm.

10 73. The method as claimed in claim 67 wherein the article of commerce is a dress shirt, wherein the support is a cardboard backing and wherein said flexible filament has a tensile strength of 2-4 lbs. and a length of approximately 3-5 mm.

74 A method of coupling an article of commerce to a support, said method comprising the steps of:

(a) providing a plastic fastener, said plastic fastener comprising

15 (i) a flexible filament, said flexible filament having a first end, a second end, a tensile strength of approximately 2-4 lbs. and a length of approximately 3-5 mm;

(ii) an inserting element disposed at said first end, said inserting element being dimensioned to enable its insertion through the article of commerce and the support and, once inserted therethrough, to be retained thereby, and

20 (iii) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through the article of commerce and the support in the direction of said inserting element; and

25 (b) inserting said inserting element of said plastic fastener into and completely through the article of commerce and the support.

75. The method as claimed in claim 74 wherein the article of commerce is a dress shirt and wherein the support is a cardboard backing.

76 A fastener clip comprising

30 (a) a first fastener, said first fastener comprising

- (i) a flexible filament having a first end and a second end,
- (ii) a first enlargement disposed at said first end, and
- (iii) a second enlargement disposed at said second end;

(b) a third enlargement; said third enlargement being severably
5 connected to said first enlargement;

(c) a fourth enlargement, said fourth enlargement not being directly
interconnected to said third enlargement, said fourth enlargement being severably
connected to said second enlargement.

77. The fastener clip as claimed in claim 76 wherein each of said first and
10 third enlargements is a transverse bar, said first and third enlargements being
arranged in a parallel, side-by-side, spaced relationship.

78. The fastener clip as claimed in claim 77 wherein said first and third
enlargements are interconnected by a connector post extending transversely
therebetween.

79. The fastener clip as claimed in claim 77 wherein each of said second and
15 fourth enlargements is a transverse bar, said second and fourth enlargements being
arranged in a parallel, side-by-side, spaced relationship.

80. The fastener clip as claimed in claim 79 wherein said first and third
enlargements are interconnected by a connector post extending transversely
20 therebetween and wherein said second and fourth enlargements are interconnected
by a connector post extending transversely therebetween.

81. The fastener clip as claimed in claim 80 wherein said fastener clip is a
runner bar-less fastener clip.

82. A method of fixing together two elements, said method comprising the
25 steps of:

(a) providing a plastic fastener, said plastic fastener comprising

(i) a flexible filament, said flexible filament having a first end, a
second end, a length and a tensile strength, said length being suitable to fix the two
elements together, said tensile strength being sufficiently strong to keep the two
30 elements fixed together during normal handling and yet sufficiently weak to enable

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the two elements to be separated from one another without being damaged by said plastic fastener merely by having the two elements pulled away from each other until said flexible filament breaks,

(ii) an inserting element disposed at said first end, said inserting element being dimensioned to enable its insertion through the two elements and, once inserted therethrough, to be retained by the two elements, and

(iii) a retaining element disposed at said second end, said retaining element being dimensioned to prevent said flexible filament from being pulled completely through the two elements; and

(b) inserting said inserting element of said plastic fastener into and completely through the two elements, with said retaining element not being inserted into the two elements.

83 The method as claimed in claim 82 wherein said two elements are different portions of a single article of clothing.

84. The method as claimed in claim 83 wherein said article of clothing is a dress shirt.

85. The method as claimed in claim 84 wherein said length of said flexible filament is approximately 4.3 mm and wherein said tensile strength of said flexible filament is approximately 2 lbs.

86. The method as claimed in claim 82 wherein one of said two elements is an article of clothing and wherein the other of said two elements is a cardboard support.

87. The method as claimed in claim 86 wherein said article of clothing is a dress shirt.

88. The method as claimed in claim 87 wherein said length of said flexible filament is approximately 4.3 mm and wherein said tensile strength of said flexible filament is approximately 2 lbs.

89. The method as claimed in claim 87 wherein said article of clothing is an article of clothing for a doll.

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96. A hand-held fastener dispensing tool for dispensing a fastener of the type comprising a flexible filament having an enlargement at one end thereof, said fastener dispensing tool comprising:

(a) a casing, said casing being provided with a needle opening;

(b) a hollow, slotted needle, said hollow, slotted needle being slidably movable back and forth between a retracted position disposed entirely within said casing and an extended position extending through said needle opening, said hollow, slotted needle being adapted to receive the enlargement of said fastener;

(c) an ejector rod, said ejector rod being slidably movable back and forth through said hollow, slotted needle to eject the enlargement disposed therein; and

(d) an anvil coupled to said casing and extending in front of said needle opening, said anvil being positioned so that said hollow, slotted needle, when in said extended position, does not extend therebeyond.

97. The hand-held fastener dispensing tool as claimed in claim 96 wherein said casing is gun-shaped and comprises a barrel portion and a handle portion.

98. The hand-held fastener dispensing tool as claimed in claim 97 wherein said handle portion is provided with a trigger opening, said fastener dispensing tool further comprising a trigger, said trigger being pivotally mounted in said casing and extending partially through said trigger opening for digital actuation thereof, said trigger being coupled to said hollow, slotted needle and also being coupled to said ejector rod.

99. The hand-held fastener dispensing tool as claimed in claim 98 further comprising an ejector rod carrier disposed in said barrel portion of said casing, said ejector rod being mounted on said ejector rod carrier, said ejector rod carrier being connected to said trigger in such a way that said ejector rod carrier is caused to slide back and forth through said barrel portion as said trigger is operated.

100. The hand-held fastener dispensing tool as claimed in claim 99 further comprising a needle carrier disposed in said barrel portion of said casing, said hollow, slotted needle being mounted on said needle carrier, said hand-held fastener

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dispensing tool further comprising a linkage coupled to said needle carrier and selectively engageable with said ejector rod carrier for coupling and decoupling said needle carrier to and from said ejector rod carrier so that said needle carrier is caused to slide back and forth in said barrel portion only during a portion of the movement of said ejector rod carrier.

101. The hand-held fastener dispensing tool as claimed in claim 100 further comprising a lever disposed within said casing, said lever being pivotally mounted at a first end on a first pin, said first pin being fixed to said trigger, said lever being pivotally mounted at a second end on a second pin, said second pin being fixed to said ejector rod carrier.

102. The hand-held fastener dispensing tool as claimed in claim 100 further comprising a feed track disposed within said barrel portion of said casing, said feed track being shaped to receive, entirely within said barrel portion, a clip of fasteners, each of said fasteners comprising a flexible filament, a first enlargement at one end of the flexible filament and a second enlargement at the other end of the flexible filament.

103. The hand-held fastener dispensing tool as claimed in claim 102 wherein said feed track is defined in part by a feed guide disposed within said casing and in part by a rib formed on the interior of said casing.

104. The hand-held fastener dispensing tool as claimed in claim 96 wherein said anvil comprises a front portion and a rear portion, said rear portion being secured to said casing, said front portion being looped and extending in front of said opening in said casing.

105. The hand-held fastener dispensing tool as claimed in claim 104 wherein said front portion of said anvil is provided with an anvil opening, said anvil opening being aligned with said opening in said casing, said front portion of said anvil also being provided with a slotted outer surface.

106. The hand-held fastener dispensing tool as claimed in claim 105 wherein said anvil opening and said opening in said casing are spaced apart by a distance of approximately 0.25-0.3 inch.

107. The hand-held fastener dispensing tool as claimed in claim 104 wherein said rear portion of said anvil is removably secured to said casing by a screw.

108. A fastener dispensing tool comprising:

(a) a gun-shaped casing, said gun-shaped casing comprising a handle portion and a barrel portion, said barrel portion being provided with an opening;

(b) a needle carrier, said needle carrier being slidably mounted in said barrel portion;

(c) a hollow, slotted needle, said hollow, slotted needle being coupled to said needle carrier and being insertable back and forth through said opening in said casing;

(d) an ejector rod carrier, said ejector rod carrier being slidably mounted in said barrel portion;

(e) an ejector rod, said ejector rod being coupled to said ejector rod carrier and being insertable back and forth through said hollow, slotted needle;

(f) a linking member coupled to said needle carrier and selectively engageable with said ejector rod carrier for coupling and decoupling said needle carrier to and from said ejector rod carrier so that said needle carrier is caused to slide back and forth in said barrel portion only during a portion of the movement of said ejector rod carrier; and

(g) a triggering mechanism, said triggering mechanism comprising a trigger, said trigger being pivotally mounted in said casing and extending partially through said handle portion thereof for manual actuation, said triggering mechanism further comprising a lever disposed within said casing, said lever being pivotally mounted at a first end on a first pin, said first pin being fixed to said trigger, said lever being pivotally mounted at a second end on a second pin, said second pin being fixed to said ejector rod carrier.

109. The fastener dispensing tool as claimed in claim 108 wherein said needle is removably coupled to said needle carrier by a locking pin.

110. The fastener dispensing tool as claimed in claim 109 wherein said barrel portion of said casing is provided with an opening for accessing said locking pin.

111. The fastener dispensing tool as claimed in claim 108 further comprising an anvil, said anvil being coupled to said casing.

112. The fastener dispensing tool as claimed in claim 111 wherein said anvil is removably coupled to said casing.

5 113. The fastener dispensing tool as claimed in claim 108 wherein said fastener dispensing tool is adapted for dispensing individual fasteners from a fastener clip, the individual fasteners comprising a flexible filament having a first enlargement at a first end thereof and a second enlargement at a second end thereof, adjacent first enlargements of said fastener clip being connected by a first connector post, adjacent second enlargement of said fastener clip being connected by a second connector post, said first enlargements of said clip being dispensed through said hollow, slotted needle, said fastener dispensing tool further comprising an ejector clip coupled to said ejector rod carrier for severing the second connector post between adjacent second enlargements.

15 114. A fastener dispensing tool for dispensing individual fasteners from a fastener clip, said fastener dispensing tool comprising:

(a) a casing, said casing being provided with an opening;

(b) a hollow, slotted needle, said hollow, slotted needle being slidably movable back and forth through said opening in said casing;

20 (c) an ejector rod, said ejector rod being slidably movable back and forth through said hollow, slotted needle; and

(d) a feed guide, said feed guide being stationarily mounted in said casing behind said hollow, slotted needle, said feed guide defining a front portion of a feed track and comprising a stage at the end of said feed track off of which an individual fastener from a fastener clip is loaded into said hollow, slotted needle by said ejector rod.

25 115. The fastener dispensing tool as claimed in claim 114 wherein said feed guide further comprises a projection engageable with the filament portion of a fastener clip for use in preventing said fastener clip from moving rearwardly in said feed track.

116. The fastener dispensing tool as claimed in claim 114 wherein said feed guide is provided with a recessed portion having a slotted bore, said recessed portion being adapted to removably receive said hollow, slotted needle.

117. The fastener dispensing tool as claimed in claim 114 wherein said casing is interiorly shaped to define a rear portion of a feed track, said rear portion being aligned with said front portion of said feed track.

118. The fastener dispensing tool as claimed in claim 117 wherein said feed track is shaped to receive entirely within said casing a plurality of fasteners.

119. The fastener dispensing tool as claimed in claim 118 further comprising a door pivotally mounted on said casing, said door providing access to said feed track.

120. The fastener dispensing tool as claimed in claim 119 further comprising a wheel rotatably mounted in said door, said wheel being adapted to engage a fastener clip disposed in said feed track.

121. The fastener dispensing tool as claimed in claim 114 wherein said casing is provided with a pair of windows for use in monitoring a fastener clip disposed in said feed track.

122. The fastener dispensing tool as claimed in claim 114 further comprising a triggering mechanism mounted in said casing, a mechanism coupling said triggering mechanism to movement of said hollow, slotted needle and a mechanism coupling said triggering mechanism to movement of said ejector rod.

123. The fastener dispensing tool as claimed in claim 122 further comprising a mechanism for advancing a fastener clip through said feed track at a rate of one fastener per trigger stroke.

124. A fastener dispensing tool for dispensing individual fasteners from a fastener clip, said fastener dispensing tool comprising:

(a) a casing, said casing being provided with an opening;

(b) a hollow, slotted needle, said hollow, slotted needle being slidably movable back and forth between a retracted position and an extended position extending through said opening in said casing;

(c) an ejector rod, said ejector rod being slidably movable back and forth between a withdrawn position disposed behind said hollow, slotted needle and an advanced position extending through said hollow, slotted needle;

(d) a trigger mechanically coupled to said casing;

5 (e) first coupling means, coupling said trigger to said hollow, slotted needle, for moving said hollow, slotted needle from said retracted position to said extended position and then back to said retracted position during a trigger stroke; and

(f) second coupling means, coupling said trigger to said ejector rod, for moving said ejector rod from said withdrawn position to said advanced position and then back to said withdrawn position during a trigger stroke;

(g) wherein said first coupling means and said second coupling means are designed so that said ejector rod withdraws from said advanced position together with said hollow, slotted needle as said hollow, slotted needle moves from said extended position to said retracted position.

15 125. The fastener dispensing tool as claimed in claim 124 wherein said retracted position of said hollow, slotted needle is disposed entirely within said casing.

126. A fastener dispensing tool comprising:

20 (a) a casing, said casing being shaped to receive, entirely within said casing, a clip of fasteners, each of said fasteners in said clip comprising a flexible filament having a first enlarged portion at a first end thereof and a second enlarged portion at a second end thereof;

(b) exactly one hollow, slotted needle coupled to said casing, said hollow, slotted needle being adapted to receive the first enlarged portion of a fastener; and

25 (c) an ejector rod disposed within said casing and insertable into said hollow, slotted needle for ejecting from said hollow, slotted needle an enlarged portion of a fastener disposed therein.

127. The fastener dispensing tool as claimed in claim 126 wherein said casing is shaped to receive entirely therewithin a clip of approximately one hundred twenty-five fasteners.

128. A fastener dispensing tool comprising:

5 (a) a casing, said casing being shaped to receive, entirely within said casing, a clip of fasteners, each of said fasteners in said clip comprising a flexible filament having a first enlarged portion at a first end thereof and a second enlarged portion at a second end thereof;

10 (b) a hollow, slotted needle coupled to said casing, said hollow, slotted needle being adapted to receive the first enlarged portion of a fastener;

(c) wherein said feed track terminates behind said hollow, slotted needle in a direction substantially perpendicular to the longitudinal axis of said hollow, slotted needle; and

15 (d) an ejector rod disposed within said casing and insertable into said hollow, slotted needle for ejecting from said hollow, slotted needle an enlarged portion of a fastener disposed therein.

129. The fastener dispensing tool as claimed in claim 128 wherein said casing is shaped to receive entirely therewithin a clip of approximately one hundred twenty-five fasteners.

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International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : B25C		A2	(11) International Publication Number: WO 00/51792
			(43) International Publication Date: 8 September 2000 (08.09.00)
(21) International Application Number: PCT/US00/05649			(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
(22) International Filing Date: 2 March 2000 (02.03.00)			
(30) Priority Data: 60/122,557 2 March 1999 (02.03.99) US 09/483,181 13 January 2000 (13.01.00) US 09/483,180 13 January 2000 (13.01.00) US			
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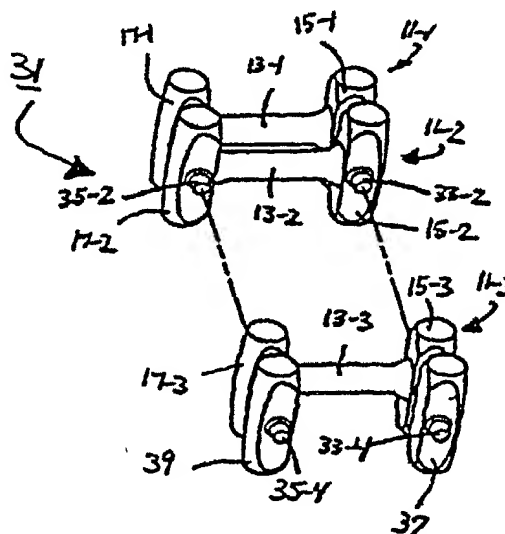
Published

Without international search report and to be republished upon receipt of that report.

(54) Title: PLASTIC FASTENER, FASTENER CLIP, FASTENER DISPENSING TOOL AND METHOD OF FASTENING OBJECTS

(57) Abstract

According to one embodiment, the plastic fastener comprises a flexible filament having a length of about 4.3 mm and a tensile strength of about 2 pounds, a first transverse bar located at one end of the flexible filament, and a second transverse bar located at the opposite end of the flexible filament. The fastener clip, which preferably does not contain a runner bar, comprises a plurality of identical fasteners of the aforementioned type, each of the fasteners being arranged in a parallel, side-by-side, spaced relationship. A connector post connects the first transverse bars of adjacent fasteners, and a connector post connects the second transverse bars of adjacent fasteners. An extra transverse bar is connected by a connector post to the first transverse bar of the last fastener, and another extra transverse bar is connected by a connector post to the second transverse bar of the last fastener, the extra transverse bars not being interconnected by a flexible filament.



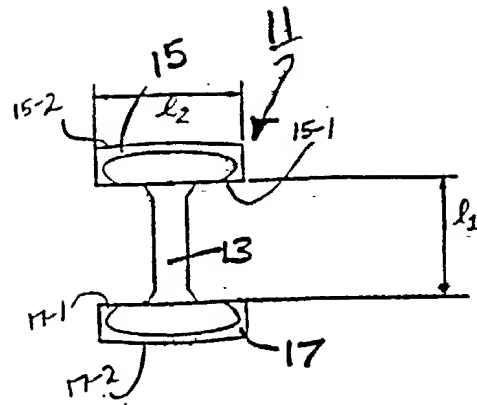


Fig. 1(a)

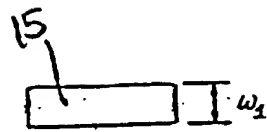


Fig. 1(b)

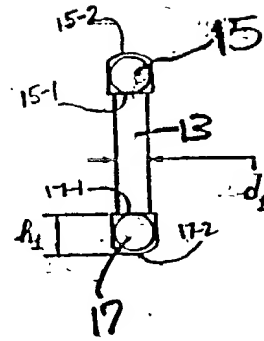


Fig. 1(c)

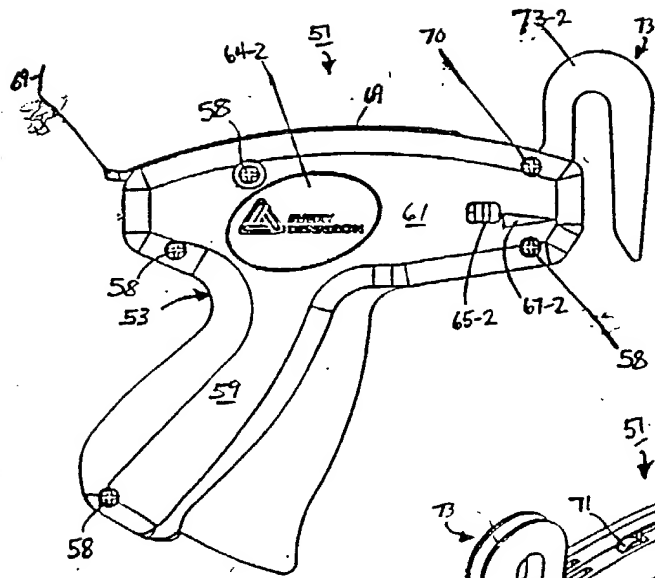


Fig. 4(a)

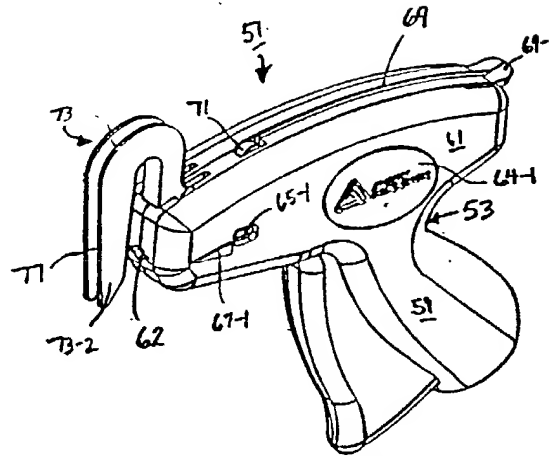


Fig. 4(b)

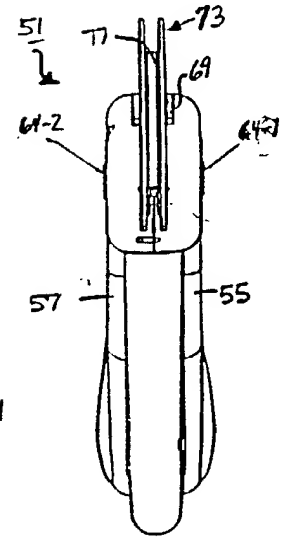


Fig. 4(c)

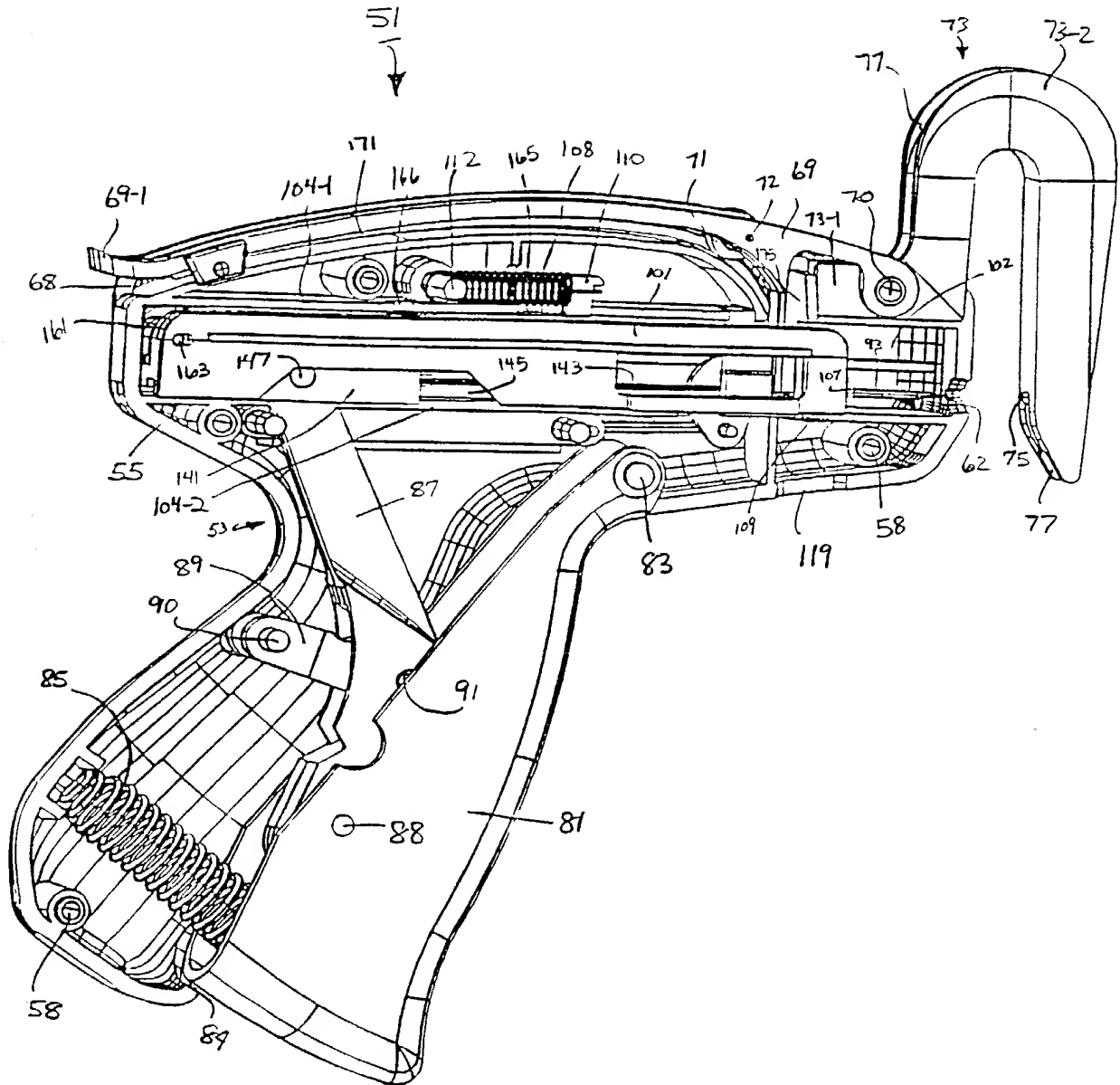


Fig. 5

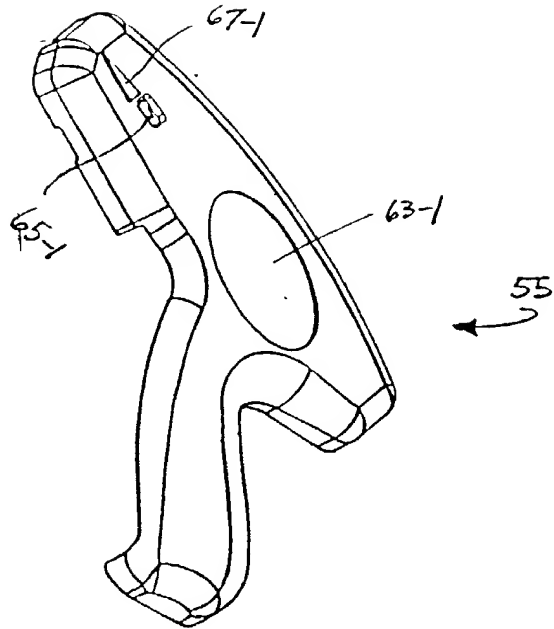


Fig. 6(a)

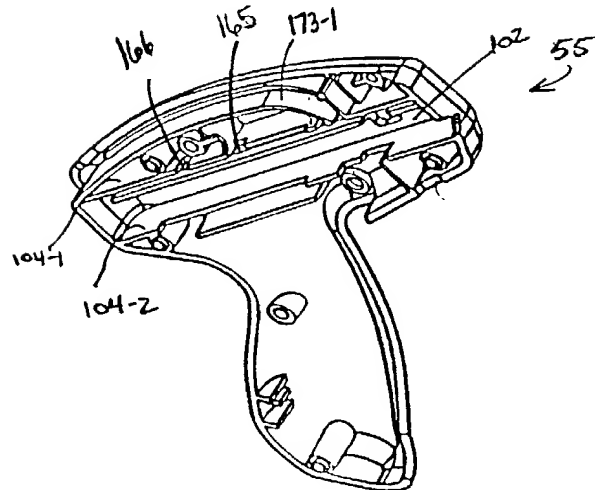
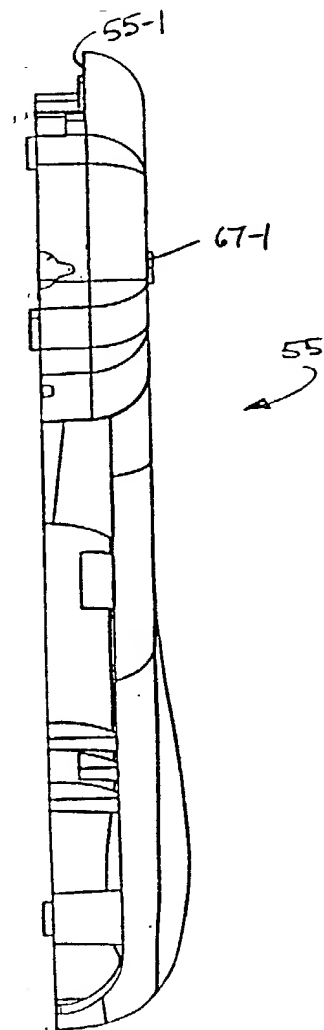
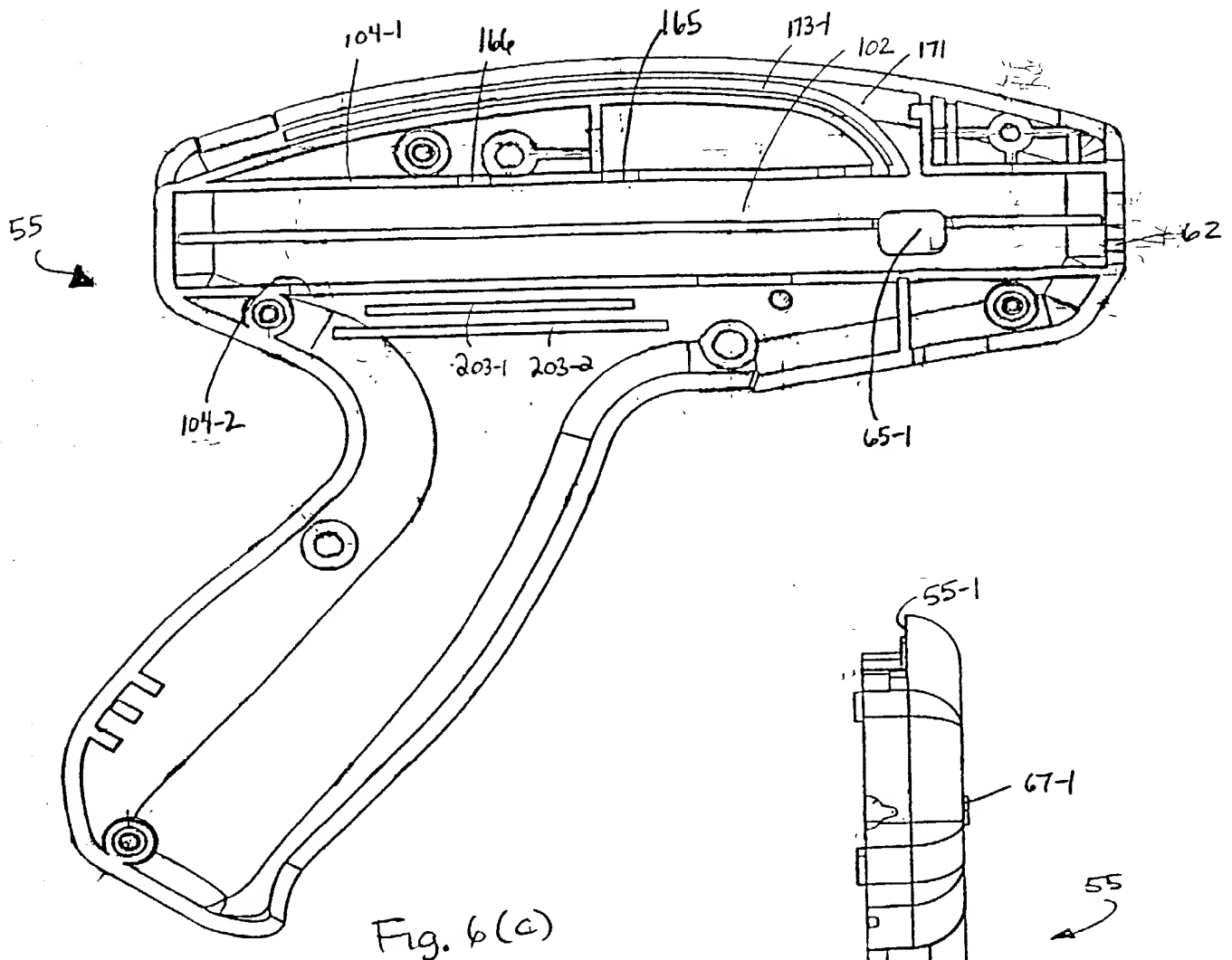


Fig. 6(b)



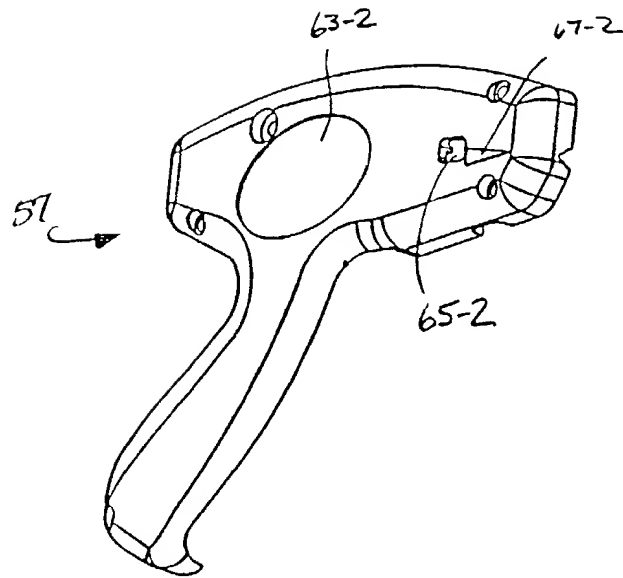


Fig. 7(a)

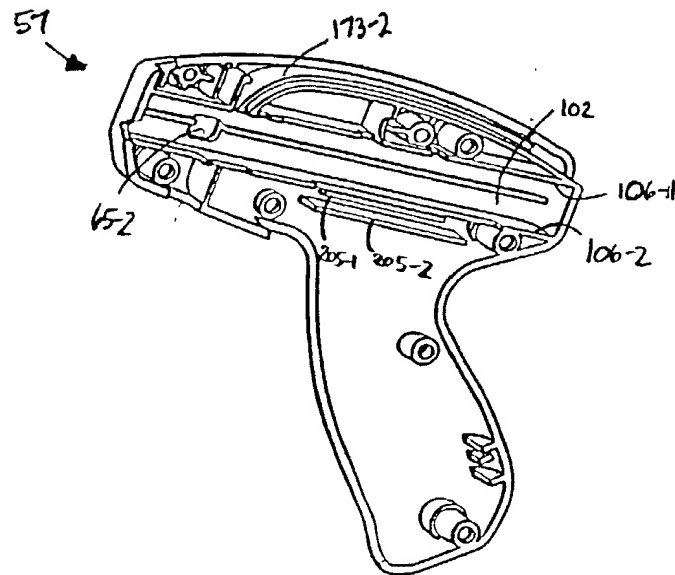


Fig. 7(b)

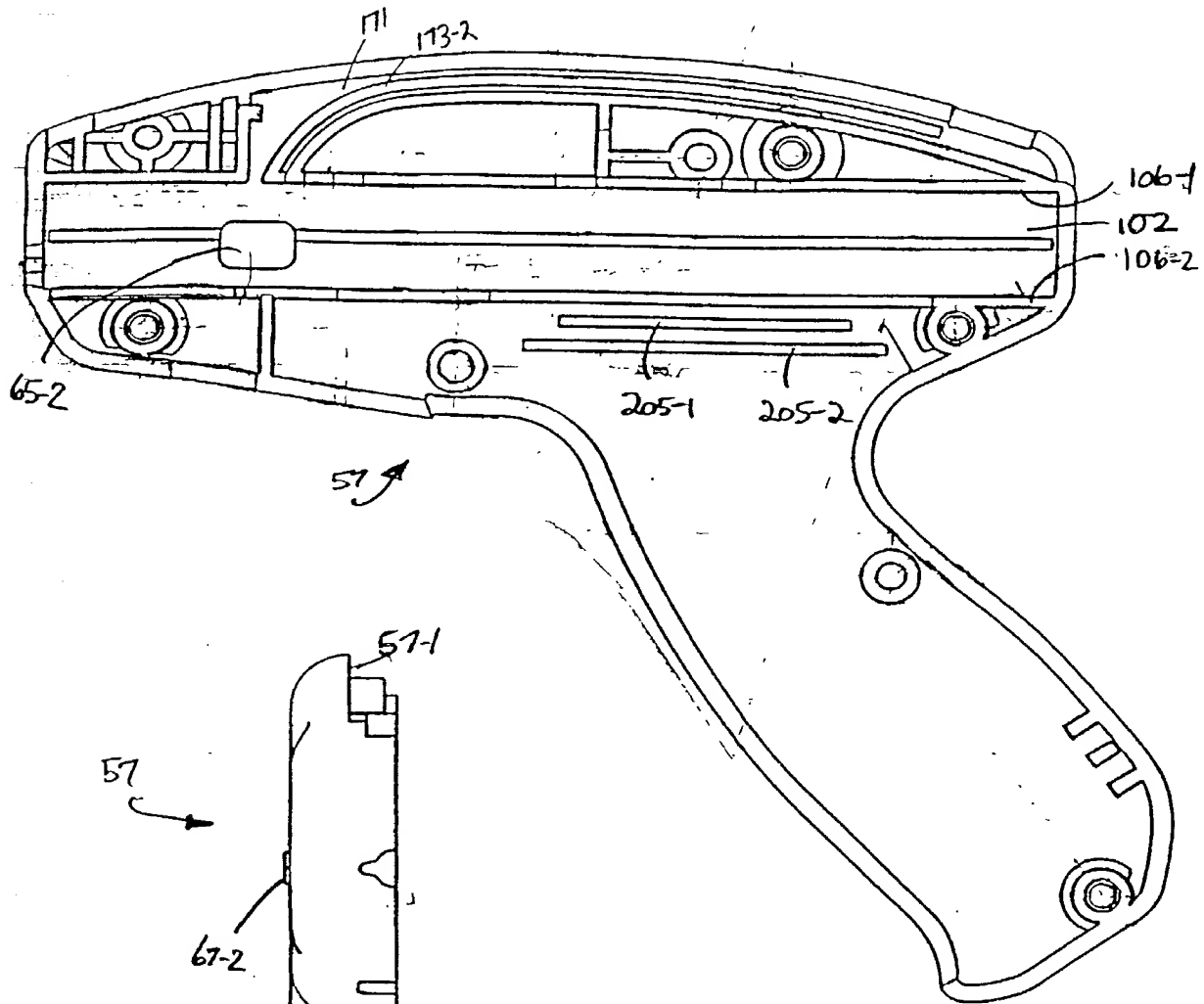


Fig. 7(c)

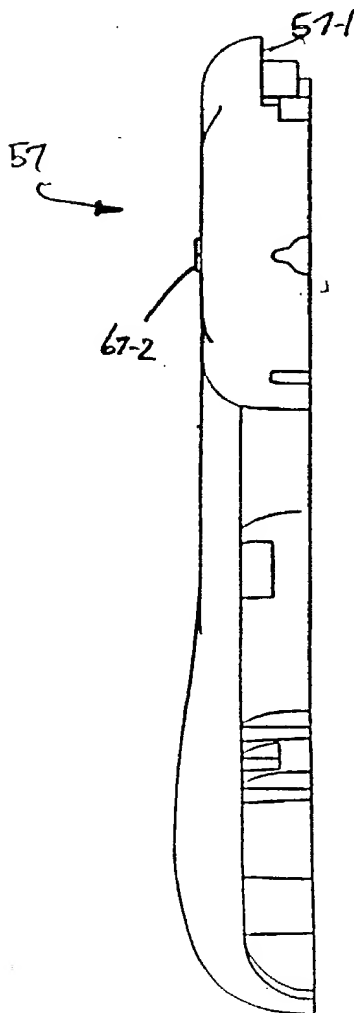
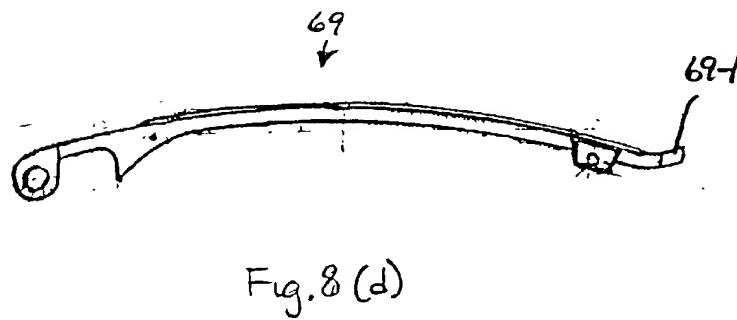
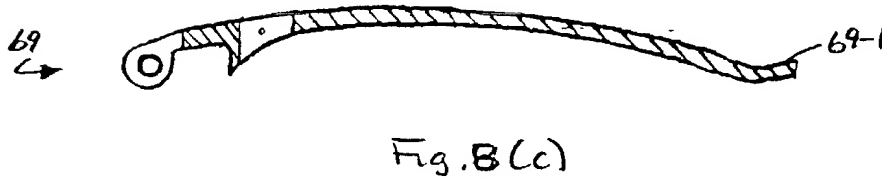
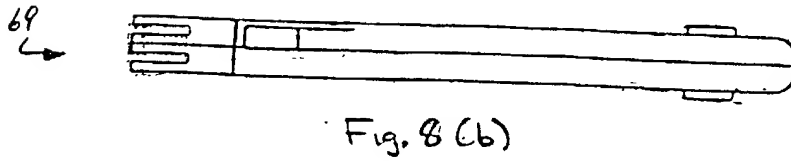
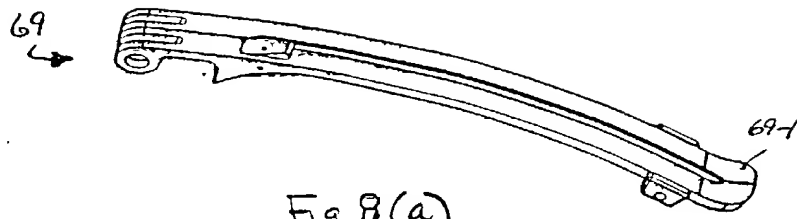
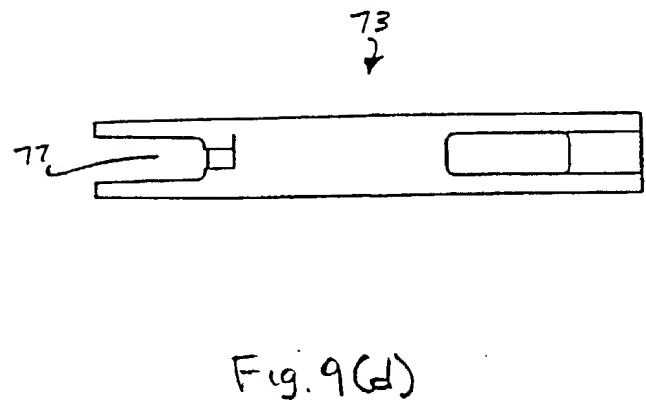
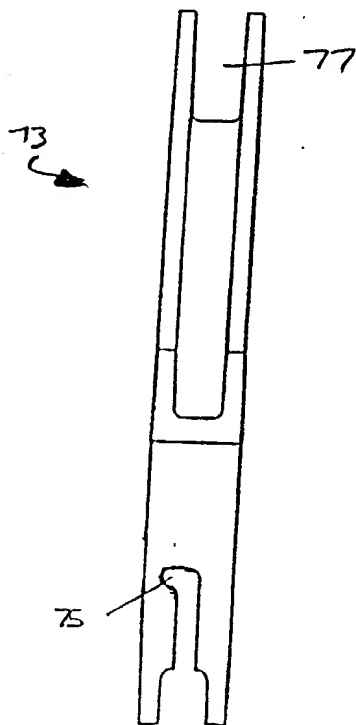
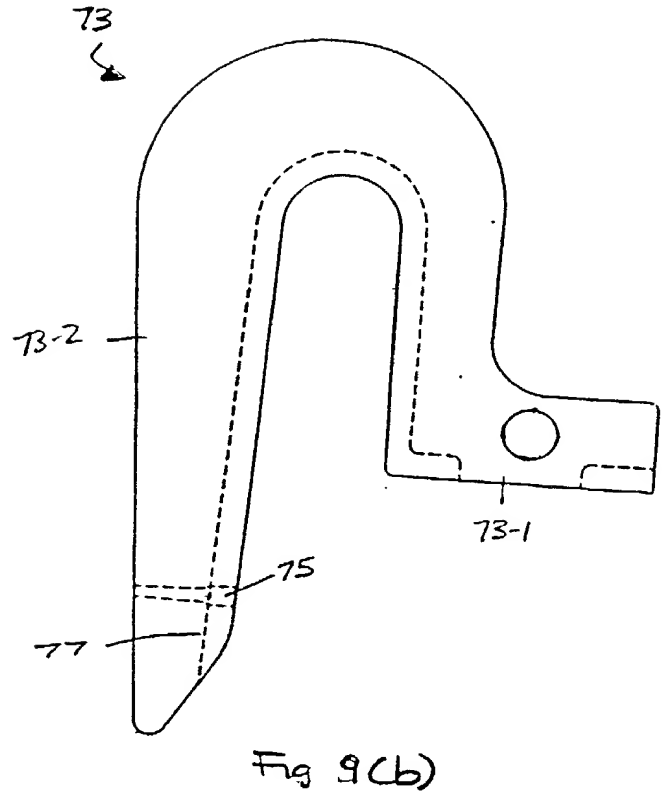
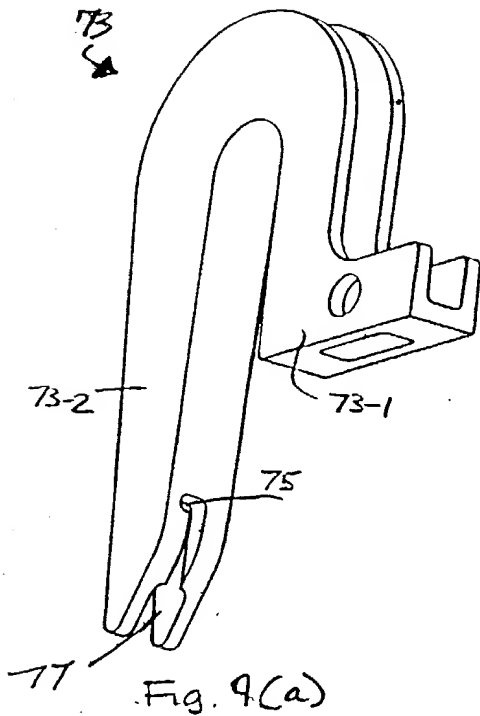


Fig. 7(d)





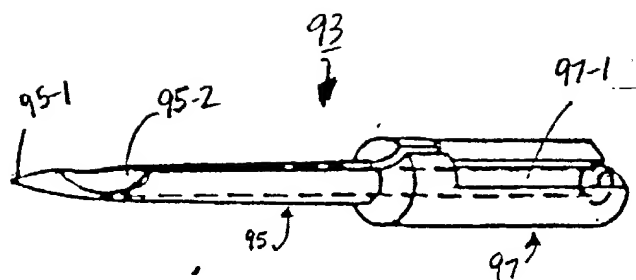


Fig. 10(a)

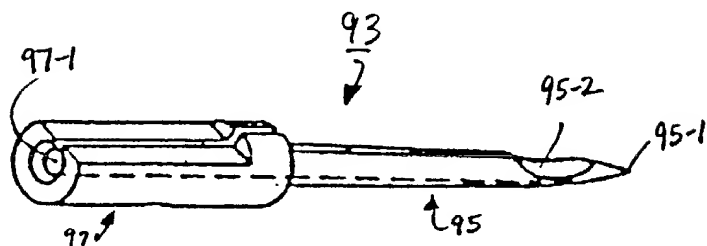


Fig. 10(b)

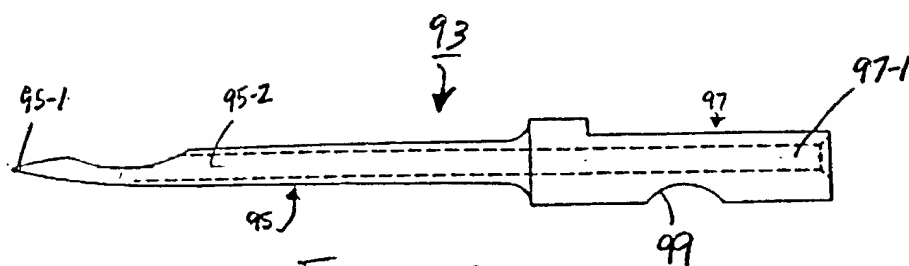


Fig. 10(c)

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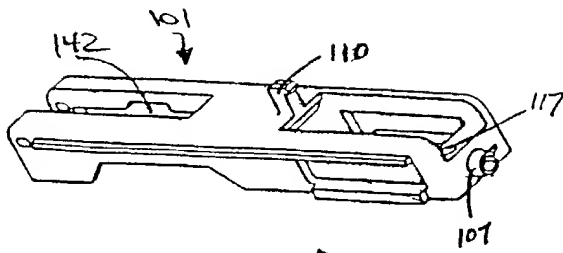


Fig. 11(a)

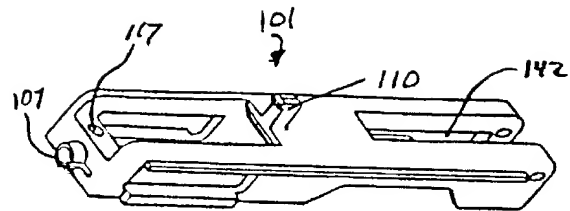


Fig. 11(b)

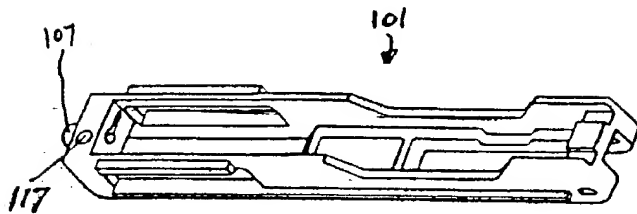


Fig. 11(c)

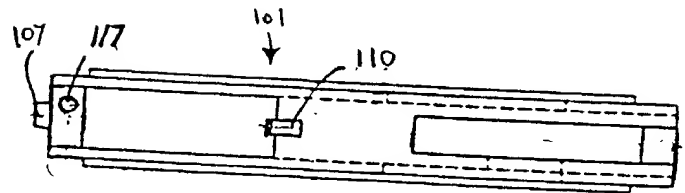


Fig. 11(d)

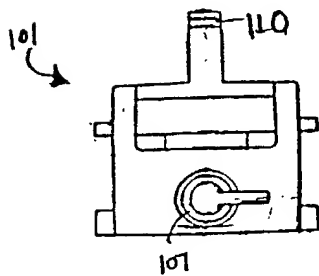


Fig. 11(e)

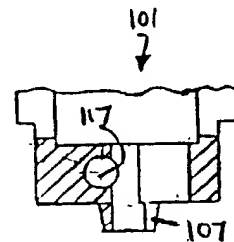


Fig. 11(f)

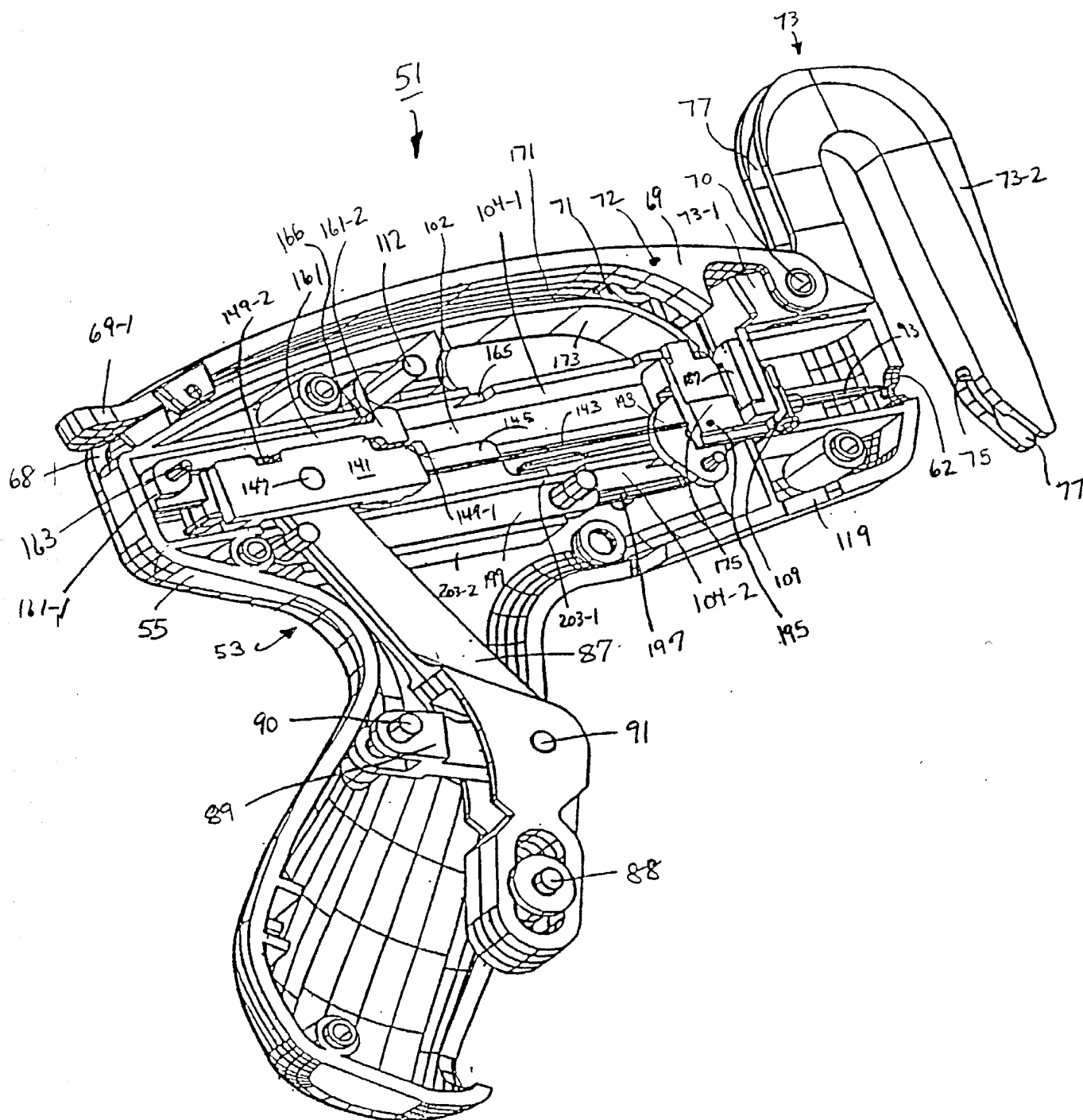


Fig. 13

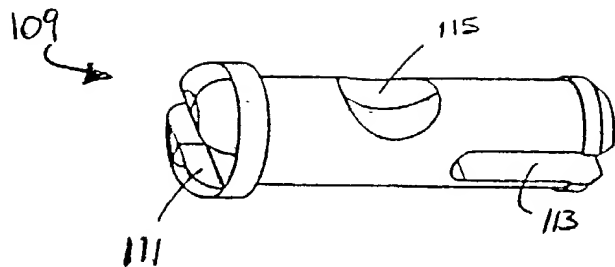


Fig. 12

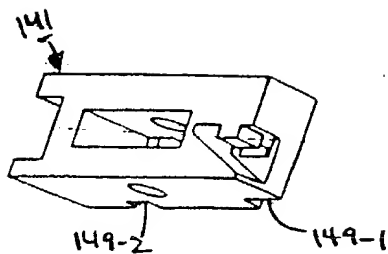


Fig. 14(a)

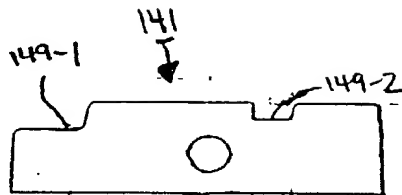


Fig. 14(b)

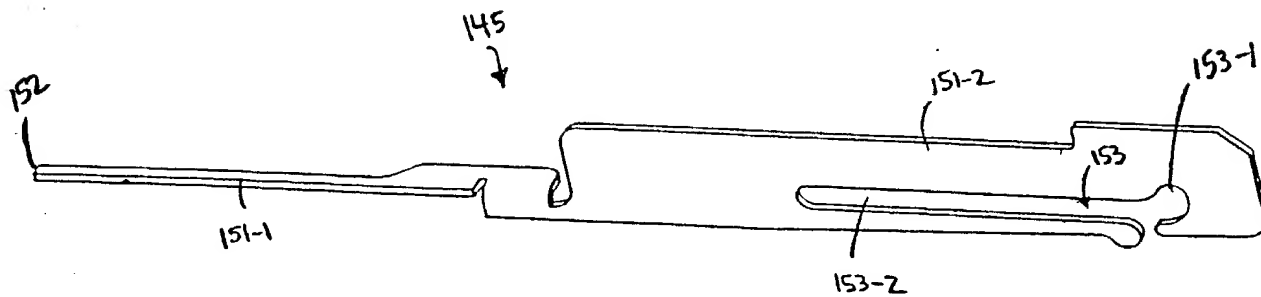


Fig. 15

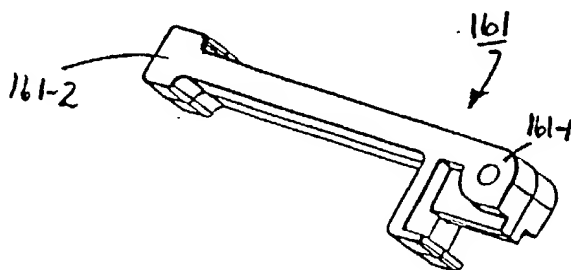


Fig. 16

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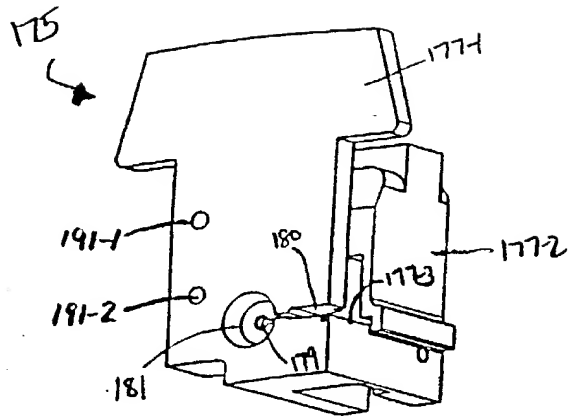


Fig. 17(a)

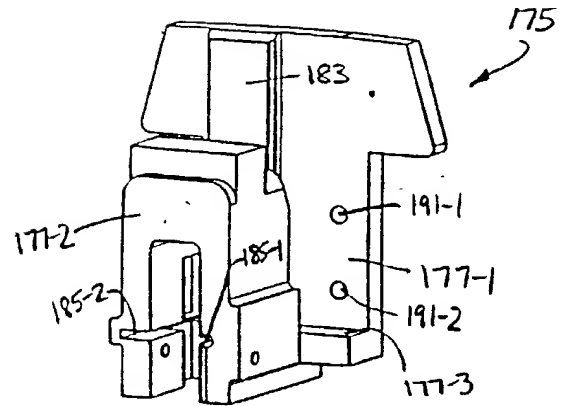


Fig. 17(b)

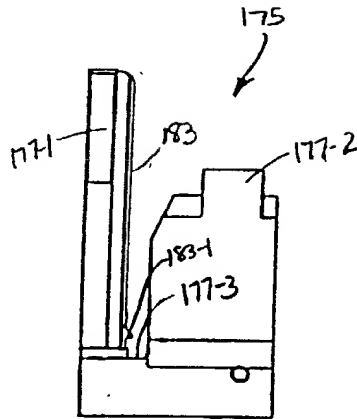


Fig. 17(c)

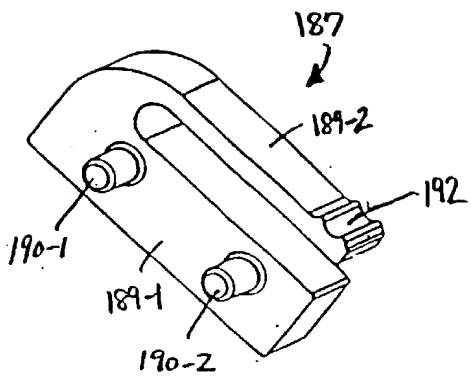


Fig. 18(a)

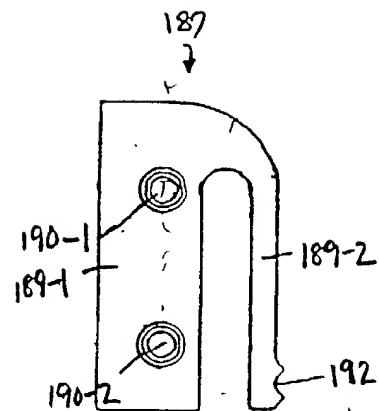


Fig. 18(b)

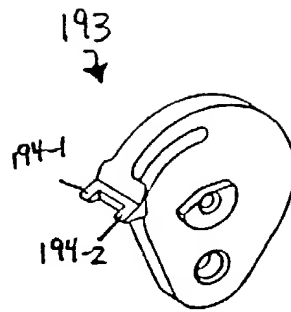


Fig. 19

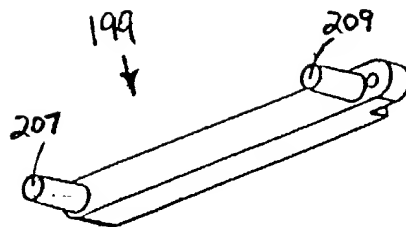


Fig. 20

Attorney Docket No. 81337CIPPCTUS

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled, PLASTIC FASTENER CLIP, FASTENER DISPENSING TOOL AND METHOD OF FASTENING OBJECTS, the specification of which:
(check one)

☐ is attached hereto.

☒ was filed as PCT International Application No. PCT/US00/05649 on March 2, 2000 and has been assigned U.S. Patent Application Serial No. 09/914,757.

☐ was filed on _____;
and assigned Serial No.: _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed
_____ (number)	_____ (country)	_____ (day/month/year filed)	[] yes [] no
_____ (number)	_____ (country)	_____ (day/month/year filed)	[] yes [] no

I hereby claim the benefit under Title 35, United States Code, 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER

FILING DATE:

60/122,557

March 2, 1999

[illegible]

09/483,180
(application number)

January 13, 2000
(filing date)

patented
(Status - patented, pending, abandoned)

09/483,181
(application number)

January 13, 2000
(filing date)

pending
(Status - patented, pending, abandoned)

(application number)

(filing date)

(Status - patented, pending, abandoned)

(application number)

(filing date)

(Status - patented, pending, abandoned)

Irving M. Kriegsman, Esq., Reg. No. 22,733; Edward M. Kriegsman, Esq., Reg. No. 33,529; and Daniel S. Kriegsman, Esq., Reg. No. 40,057.

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(508) 879-3500

I hereby declare that all statements made herein of my own knowledge are true and that any statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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 Citizenship: USA

Inventor's signature:  Date: 5/6/02

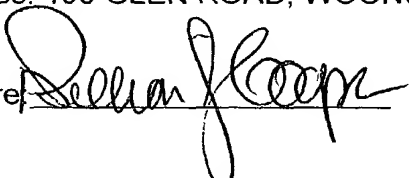
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Inventor's signature: _____ Date: _____

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